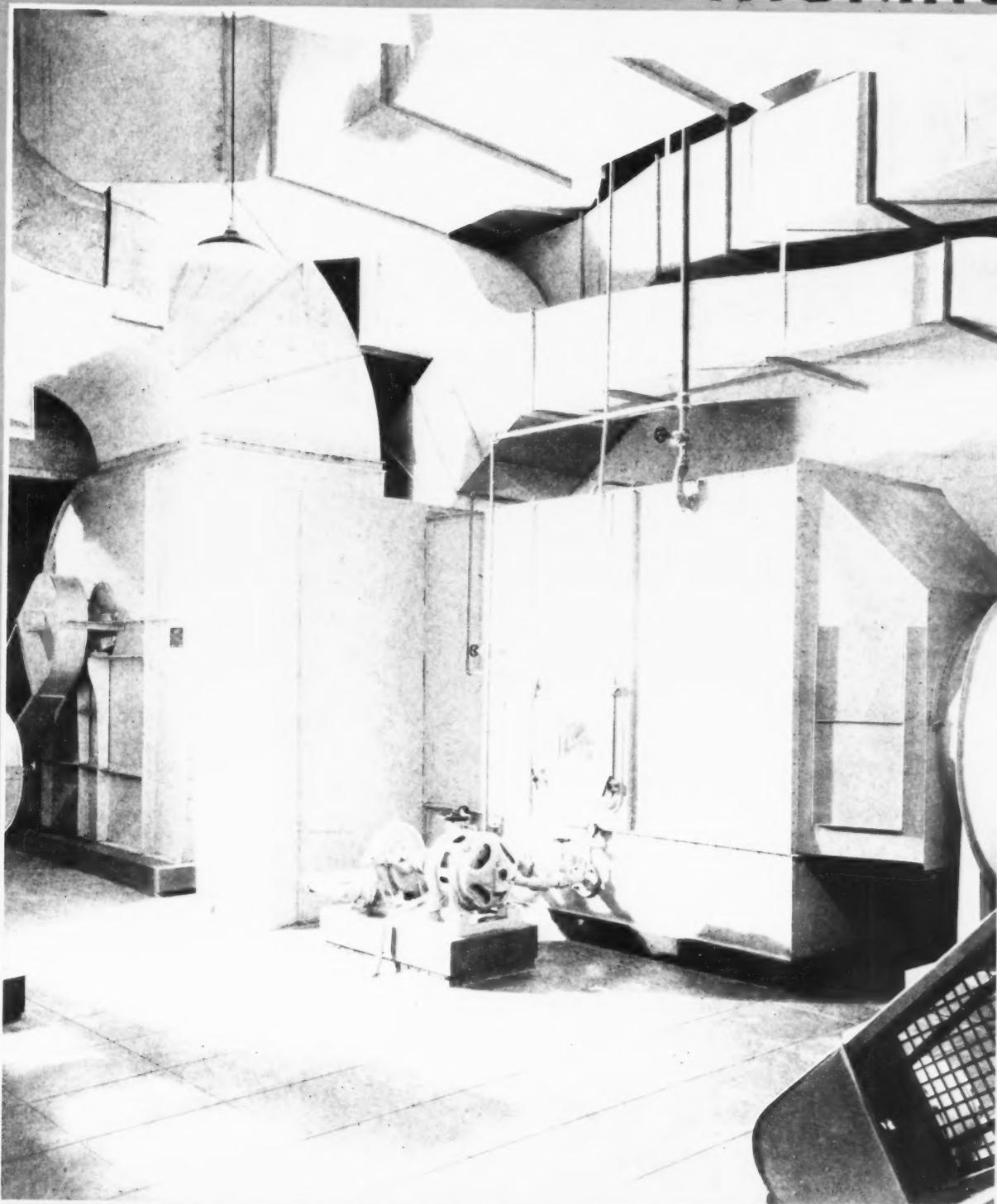


AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



ESTABLISHED
1880

INE,
32

This frieze . . . is REVERE Leadtex



Here, in this beautiful frieze around the Pellissier Building is clearly shown today's trend toward ornamental metal store fronts.

There are about 650 linear feet of this frieze, which is four feet wide. Over 2600 square feet of sheet metal were required . . . all of it Revere Leadtex . . . lead-coated copper.

The photograph gives a fair idea of the ornamentation. But it does not by any means convey the full beauty of the stamping, the coloring of the Leadtex.

Leadtex was also used for all the spandrels in the tower.

Revere Leadtex enjoys a real preference on such jobs, both on new construction and on remodeling. Not only that, Revere Leadtex starts jobs of this type. To the Sheet Metal Contractor, Revere Leadtex is an active business producer. What's more, it's profitable business! You can profit by this, too.

For further information about Revere Leadtex (as well as Revere Sheet Copper) and how they can help business, address Revere Copper and Brass Incorporated, 230 Park Avenue . . . New York City.



Pellissier Building, Los Angeles. Top photo shows a close-up. Architect: Morgan Walls and Clements . . . General Contractor: William Simpson Company . . . Sheet Metal Contractor: National Cornice Works . . . Stamping: Los Angeles Cornice and Stamping Works. All of Los Angeles, Calif.

Revere Copper and Brass

INCORPORATED

Revere
COPPER
BRASS
Products

Baltimore Division, Baltimore, Md.

Dallas Division, Chicago, Ill.

Michigan Division, Detroit, Mich.

Taunton-New Bedford Division, Taunton, Mass.

Higgins Division, Detroit, Mich.

Rome Division, Rome, N. Y.

EXECUTIVE OFFICES: NEW YORK CITY

GENERAL OFFICES: ROME, N. Y.

COOL, CLEAN AIR *in SUMMER*

. . . circulated by forced draught through wall ducts carrying warm air in Winter—that's what makes Mid-Summer Profits for MW Dealers

Summer profits—selling oil-burning utilities? Certainly. Our dealers are making them selling MW "Automatic Weather Control Units."

This famous home heating and cooling unit makes a splendid summer job of driving out stifling, stagnant heat and replacing it with refreshingly cool, filtered, positively circulated, moving air.

Home owners buy MW "Automatic Weather Control Units" all through summer, because it gives them the comforts of a cool, air-conditioned home and at the same time keeps the premises ready for heating at the approach of Fall weather.

The fact that the MW "Automatic Weather Control Unit" may be connected to present wall ducts—that it reduces basement ducts, saves fuel bin space, avoids periodical wall and ceiling cleaning, does away with electric fans, and winter or summer operates with amazing economy—are additional reasons for the profitable all-season business of MW dealers.

Write for details of our interesting dealer franchise—for literature describing our complete line including the latest sensation, the New MW Automatic Boiler Unit and Unique Gyro-Flame Burner.

OIL-BURNING

MW

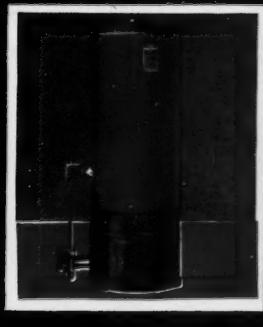
AUTOMATIC

WEATHER CONTROL UNITS

MW AUTOMATIC WATER HEATERS
Domestic and commercial sizes.
For houses, apartments, office buildings, schools, shops, factories. Single and battery installations.
Hot water at lowest cost.

MW AUTOMATIC BOILER UNITS
Heating with steam or hot water.
Incorporate the amazing oil-burner development—the new, super-efficient MW Gyro-Flame Burner.
Small and large capacities.

PRODUCTS THAT SELL SPRING, SUMMER, FALL, WINTER



MW "AUTOMATIC WEATHER CONTROL UNIT"

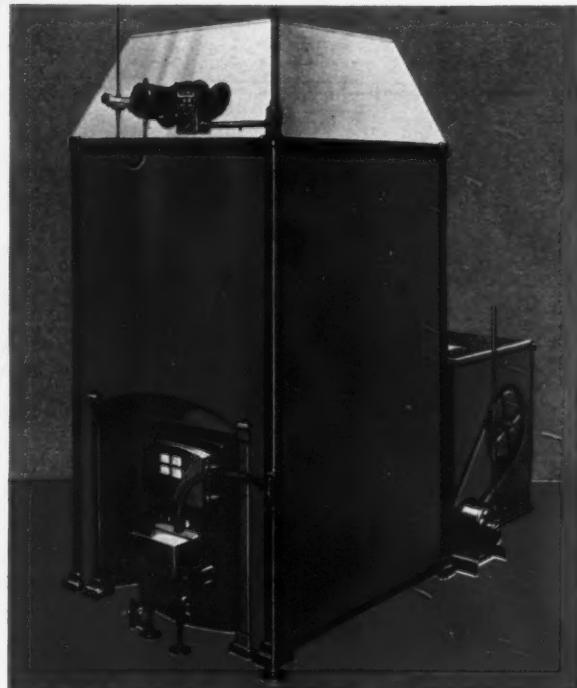
Round type, for greatest space economy. Operating efficiency and economy identical with square type shown above. Warms in winter, cools in summer—automatically.



MW OIL-BURNING COOKING RANGES

Two types—for homes, restaurants, lunch-rooms, roadside stands, hotels, clubs, etc. Quick, clean, uniform, controlled heat—the better, more economical way of cooking, frying, roasting, baking.

Manufactured by MOTOR WHEEL CORPORATION, Heater Division, Lansing, Michigan



This "Weather Control" finds a ready market in your community. It is a matched unit, including oil burner, all-steel combustion chamber, thermostatic control, blower, humidifier, etc.—Listed as Standard by Underwriters' Laboratories.

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Merchandising
Ventilating

Published Every Other Monday

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Yearly Subscription Price — In United States, \$2.00; Canada (including duty) \$3.00; Foreign, \$2.00; Single Copies, \$.25. Back numbers \$.50.

AMERICAN ARTISAN

Founded 1880

VOL. 101

No. 12

JUNE, 1932

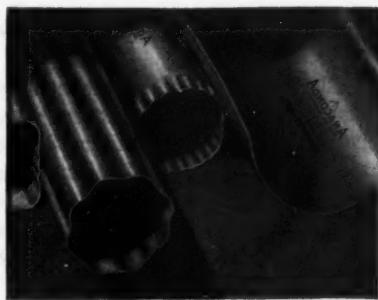
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Easy to sell Copper to *this* man

Just one experience with metal that rusts is enough to convince most people of the sound economy of Copper sheet metal work



ANACONDA
from mine to consumer

The public today is more than ever interested in the performance of building materials...more than ever aware that rustable metal work is troublesome and expensive. You can capitalize the public interest in durable materials, and sell profitable sheet metal jobs of Anaconda Copper more easily because of it. Leading sheet metal supply houses carry Anaconda Copper in sheets, rolls and Economy strips, and Copper gutters, leaders, elbows and shoes trade-marked ANACONDA. The American Brass Company, Waterbury, Connecticut.

ANACONDA COPPER

True Talks

with successful sheet metal men

SERIES No. 2



NUMBER 5

MEET THE STEINHORST FAMILY

.. Monel Metal has helped them build a profitable business!

IF YOU like "success stories," you'll enjoy reading how Emil Steinhorst and his eight sons have built one of the biggest and most prosperous sheet metal businesses in New York State's thriving Mohawk Valley.

This modern business romance began 24 years ago when Emil Steinhorst, Sr., built a tiny sheet metal shop in Utica, N. Y. The building contained only 2,800 square feet of floor space, but this was made to serve a steadily growing trade until 1921 when the pressure of increasing volume forced the concern to build again . . . this time a shop containing 19,000 square feet.

Just about this time the Steinhorst firm began to experiment with a comparatively new material . . . Monel Metal. Although they were pioneers—probably the first fabricators of Monel



Like father, like sons! The Steinhorst family . . . progressive, prosperous and Monel Metal boosters to a man!

Metal equipment in Utica—Steinhorst & Sons could readily foresee a big market for Monel Metal work. Here was a metal which offered a unique combination of properties—rust-immunity . . . corrosion-resistance . . . solid, chip-proof structure and steel-like strength. A metal literally "made to order" for an endless variety of industrial and household equipment!

Pails and dippers for the textile mills which dotted the thriving Mohawk Valley were the firm's first Monel Metal products. These proved so successful that orders began to roll in for larger equipment such as dye tanks,

tank linings and dye sticks. Meanwhile, the company was developing its Monel Metal business among packing plants and other industries. It also found a profitable market among home owners for Monel Metal sinks and range hoods.

By 1929 the Steinhorst business had grown to such proportions that the firm had to more than double its space. Today the company owns the big daylight plant pictured on this page. There are 48,000 square feet of floor space in this modern building.

Emil Steinhorst & Sons are making money on Monel Metal work and there is no reason why you should not do the same. Profitable Monel Metal business also means satisfied customers. Write for more complete information. Inquire particularly about our special sales literature prepared for your use.



The busy, modern sheet metal plant of Emil Steinhorst & Sons, Utica, N. Y. where some of the finest Monel Metal jobs in central New York State are being turned out on a profitable basis.

Monel Metal is a registered trade mark applied to an alloy containing approximately two-thirds nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

A HIGH NICKEL ALLOY

MONEL METAL
NICKEL ALLOYS PERFORM BETTER LONGER



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

“Let’s Get Together”



says . . .

Agricola

“SUPREME”



“FURNACE WARMTH
FROM THE
SUNNY SOUTH”

“It’s as simple as A B C, gentlemen. The dealer who offers something outstanding—a bigger value for the furnace buyer’s money—he’s the one who gets the business . . . and the profits.

“That’s the reason why I am anxious to tell you about the Agricola proposition. I have helped a lot of dealers get the upper hand on the present situation by giving them something really worthwhile to offer to the prospective furnace buyer.

“Judge for yourself. Isn’t this a happy combination for making sales: 1—Greatly Increased Heating Efficiency; 2—Improved, Durable Construction; 3—Interesting Price?

“I’d like to give you the complete Agricola story. Why not get in touch with me now?”

—Agricola “Supreme”
LEADER OF FURNACES

AGRICOLA FURNACE CO., Inc.
Gadsden, Alabama
Offices in Principal Cities

GO AFTER PROFITS WITH TONCAN IRON



The bigger the job the bigger the profit—unless competition makes you do a lot of work for little or no profit. Then Toncan Iron can help you because, in point of service, Toncan knows no competition, and consequently can be sold on the basis of quality, not price.

Toncan Iron is an alloy of refined iron, copper and molybdenum. It costs less to fabricate because of its easy working qualities. It costs less per year of service because of its extreme resistance to rusting. And there is no other metal just like it

Lake Wales Citrus Growers Association Packing House, Lake Wales, Florida, said to be the largest in the world. Toncan Iron applied by J. E. Swartz & Co., Lake Wales. G. A. Miller, Inc., Tampa, Florida, General Contractor.

—it beats competition because it stands alone.

Send for a copy of "The Path to Permanence" showing hundreds of applications—from furnace pipes to farm buildings, mail boxes to airplane hangars. It will give you ideas on types of business that perhaps have not occurred to you before. Write today.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES  YOUNGSTOWN, OHIO

STEP ON IT

Let us send you a sample Barnes Elbow for your personal test of rigidity. "STEP ON IT". You will find our claims of superiority very conservative.

Sheet Metal Men everywhere have learned the Barnes Elbow story. Have you? It is well worth while.

You will find all Barnes Products offer unvarying quality.

Make this free test and then "STEP ON IT" for your jobber will likewise "STEP ON IT" when orders specify

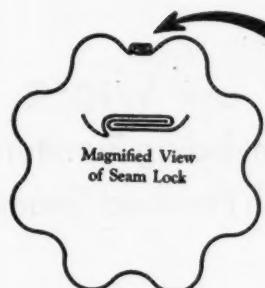
Barnes

**Cash in on the Barnes line.
It is a genuine asset to the
business growth of every
sheet metal contractor....**

The "Barnes" Super Elbow

HEAVIER—STRONGER

... yet cost no more



The Barnes
Locked Seam
cannot come
apart



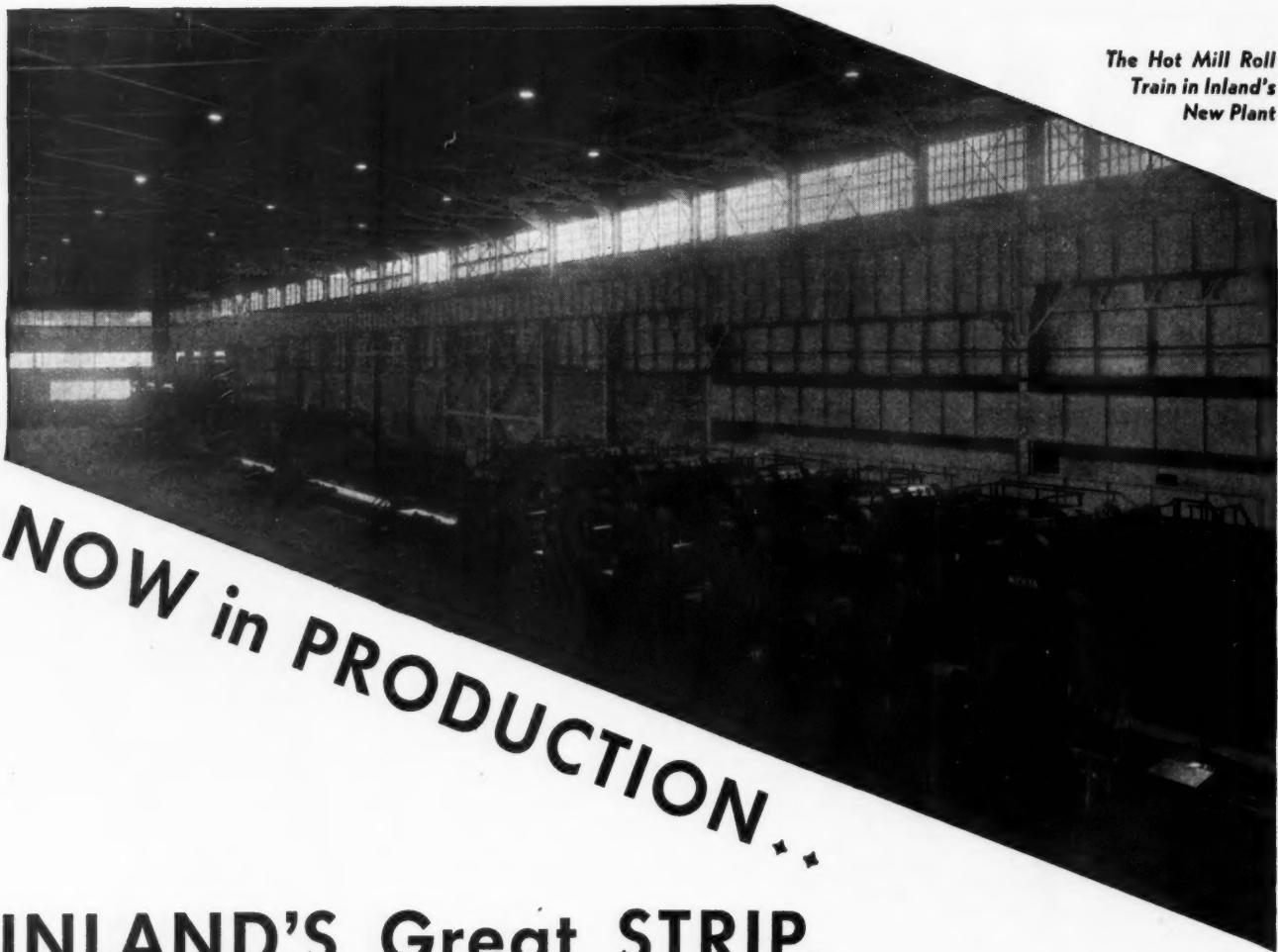
BARNES METAL PRODUCTS COMPANY

4425 West 16th Street

CHICAGO, ILLINOIS

Manufacturers of Conductor Pipe, Elbows, Eaves
Trough and Fittings • All Sizes • All Metals

Stand on one and test its strength



*The Hot Mill Roll
Train in Inland's
New Plant*

NOW in PRODUCTION...

INLAND'S Great STRIP, SHEET, and PLATE PLANT

YEARS OF STUDY • • •

MILLIONS of DOLLARS • • •

MONTHS of WORK, and NOW

The Highest Development in Continuous Sheet, Strip, and Plate Mills ready to serve you with • • •

• U. M. PLATES UP TO 69" WIDE

• HOT and COLD ROLLED STRIP 6" and WIDER

• EVERY GRADE of SHEET STEEL • • • Including Furniture, Auto Body, Full Cold Rolled and other High Finished Sheets.

INLAND
ABLE SERVANT OF THE CENTRAL WEST
STEEL

Sheets Strip Plates
Bands Structural Piling

Rails Track Accessories
Bars Rivets Billets

38 S. Dearborn Street, Chicago

There Is A Definite Replacement Market For WEIR Furnaces This Year



NEW homes are not so numerous—but NEW furnaces are going to be necessary in many old homes before next winter if the occupants are to be comfortable. And those who have had the experience of having a cheap furnace wear out after only a few seasons of use will want a longer-lived furnace for replacement. (As a matter of fact, 4 out of 5 WEIR furnaces are sold for replacements).



This year it is going to be easier to sell **QUALITY.**
AND THE MAN WHO IS SELLING THE WEIR
WHICH IS NOW IN ITS FIFTIETH YEAR



will have the most impressive story to tell.

If you want to sell a first-class furnace backed by a generous program of advertising and selling helps, write for the WEIR proposition.



Pioneers In The Steel Furnace Industry

The Meyer Furnace Company's line includes competitive as well as quality merchandise—also air conditioning equipment for coal, oil or gas burning.



STANLEY RESOR

President, J. Walter Thompson Company

"I thought that we had some appreciation of the value of the A. B. C. until we started work in countries where circulations are not audited. It is difficult for anyone in this country to realize what the absence of audited figures means in additional outlay of time, work, and money. In many offices in other countries it has taken our organization literally months of intensive advance work solely on the problems of circulation. Most of the information obtained under these difficulties, had there been an A. B. C., would have been instantly available.

"To these first costs must be added the continuing cost of keeping circulation data up to date.

"I think it can be safely said that the A. B. C. is one of the outstanding successful co-operative undertakings of the generation."

Stanley Resor

GEORGE PEARSON

Director of Media

Chicago Office, J. Walter Thompson Company

"Perhaps only those of us who have been buying advertising space for a time we have to measure in decades, can fully appreciate the great job the A. B. C. has done. And its work is just as necessary now as it ever was in the past.

"I think the current trend of business requires us all to give more detailed study than ever before to actual A. B. C. Audit Reports and Publisher's Statements. To appraise the circulation of a publication intelligently, we must know the distribution, circulation methods, subscription prices and other facts that are reliably shown only in the reports of the Bureau.

George Pearson



● Would you picture for yourself American advertising as it existed two decades ago? Follow business, then, as it seeks the markets of the world. Survey with men in American advertising agencies, the field of media in Britain, on the Continent, in South America, in the Far East.

There, in circulation claims, chaos still prevails. Expensive research and constant vigilance are needed in buying space. Advertising must surmount a needless hurdle—an obstacle which in this country has been removed forever.

Facing the same conditions under which advertising still struggles in other lands, American advertising sixteen years ago demanded a change. The regulatory force came from within. Advertisers, advertising agencies and publishers joined in founding the Audit Bureau of Circulations.

Everybody today knows the plainly printed reports of the A. B. C. They cover almost every important publication. They are packed with facts which the wise buyer of space takes pains to heed.

Men who seek the last dollar of value in their advertising budgets are not content with figures on paid circulation only. They search out the whole story, as told in the complete A. B. C. reports. And therein they find the gauge to true values in the selection of advertising media, the means to make an appropriation

yield the results that modern business demands.

As a recognition of service, not only agencies and publishers, but a distinguished group of advertisers in the United States and Canada, hold membership today in the Audit Bureau of Circulations.

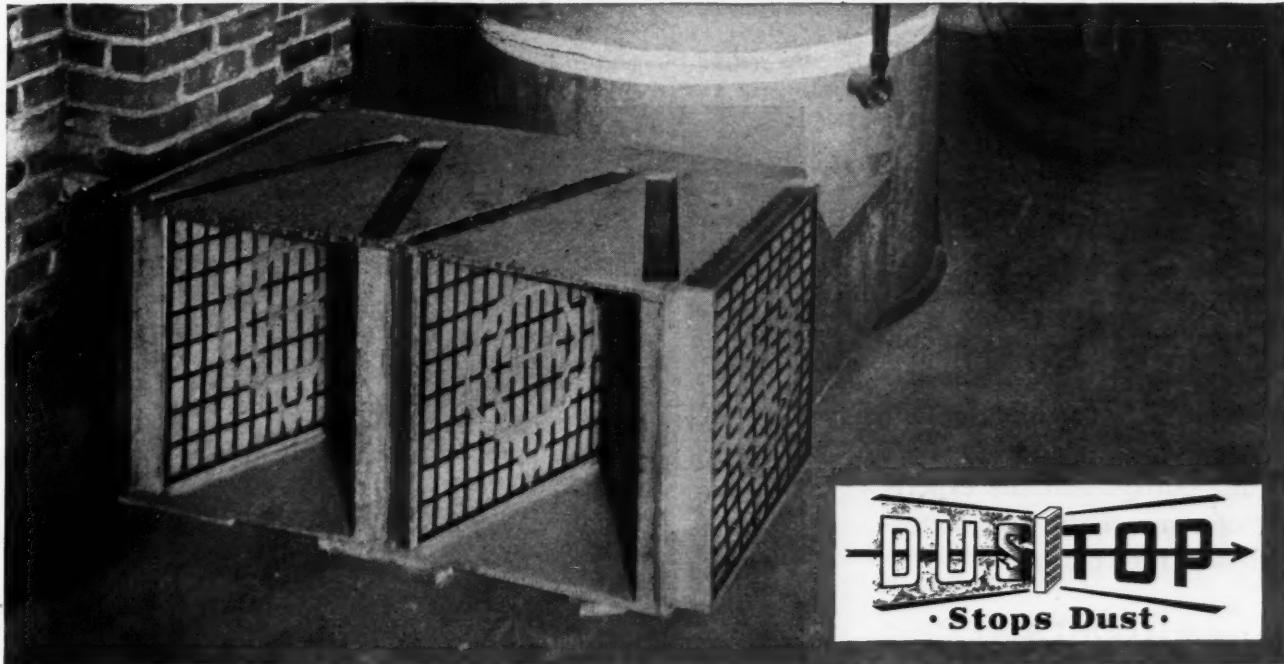


An advertisement by the

AUDIT BUREAU OF CIRCULATIONS

Executive Offices . . . Chicago

8,500,000 PROSPECTS *and profit in every job*



A typical installation of DUSTOP filter units on a standard type of warm air furnace.

- Dust and dirt circulating from 8,500,000 furnaces! 8,500,000 gravity warm air furnaces just waiting for aggressive dealers to install gravity filters!

It's your job to make dirty furnaces clean. You can do this job at a profit—with DUSTOP.

DUSTOP retails to the householder at \$1.50. This low figure enables you to use as many of them as are necessary to do an effective job.

Dust is one of the gravest concerns of the modern housewife. There's a smooth selling approach for you. Tell housewives that you can stop furnaces from spreading dust and dirt and you'll get into as many basements as the meter man.

DUSTOP filters will live a whole heating season and more. DUSTOP is the only filter that will do a real job of cleaning on low velocities—as low as 25 feet per minute. And

average velocities will run around 140 feet per minute on a moderately cold day.

The new DUSTOP glass wool filter offers furnace dealers a fine opportunity to build up a volume of profitable business.

For more detailed information mail the coupon today. You will receive a booklet giving complete information on DUSTOP installation both for gravity furnaces and for the revamping of gravity jobs for mechanical circulation of filtered and heated air. Owens-Illinois Glass Company, Toledo, Ohio.

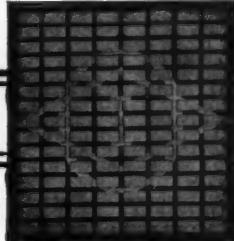
OWENS-ILLINOIS GLASS COMPANY (Industrial Materials Division)
Toledo, Ohio

Please send me your booklet "Jobs To Do at a Profit."

Name _____

Address _____

OWENS-ILLINOIS



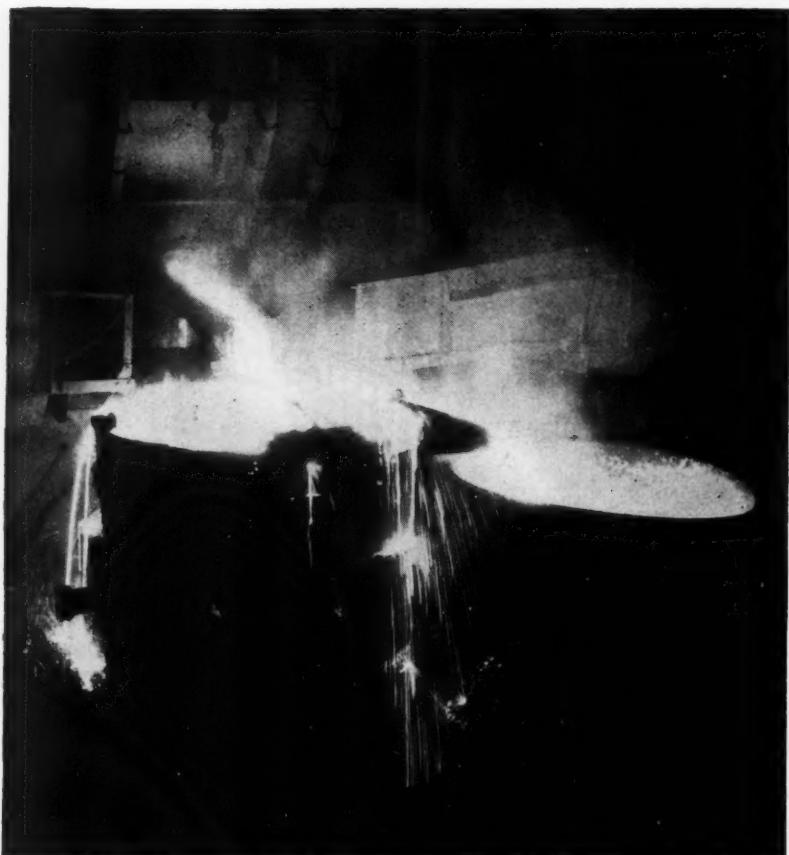
AIR FILTERS

MOLTEN metal roaring as it pours like water, 100 tons of it . . . searing heat, 2600 degrees and more . . . smoke . . . leaping flames . . . flying sparks . . . Stygian blackness lighted by white hot metal — that's the tapping of a heat of GOHI, the most spectacular scene in the making of steel.

But back of this spectacular scene, and in every operation until the finished GOHI Sheet Metal is packed into the cars, is a degree of control unique in mill practice — exact temperatures, proper combination of basic materials, laboratory analysis for purity, and the experience of some of the best metallurgists in the country.

The result is GOHI Sheet Metal — an iron-copper alloy that shows unusual resistance to wear, weather, rust, and corrosion. Soft, homogeneous, ductile, GOHI is easy to work, to bend, form, shape, stamp, draw, cut, and weld. Trust your reputation to GOHI and you won't go wrong.

HERE'S WHERE GOOD METAL BEGINS



GOHI
PRONOUNCED "GO-HIGH"

SHEET METAL

THE NEWPORT ROLLING MILL COMPANY, Newport, Kentucky

VOLUME 101

AMERICAN ARTISAN

NUMBER 12

WARM AIR HEATING • SHEET METAL CONTRACTING • AIR CONDITIONING**A New Era For The Furnace Dealer**

THE business situation which has existed during the last two years has focused the attention of business on one problem which we did not have to face during the years when all business was on the upgrade.

This problem is the advisability of securing outlets which remain stable in spite of business conditions.

To amplify—during the years since the war, business generally has been a sales market. Thousands of new products have been invented and produced. Each of these products, regardless of its intrinsic value, had to find a market. The common method of getting public acceptance was to hire salesmen or some sales agency to introduce the product to buyers.

Because there were so many products, the salesman became America's symbol of business success, in fact, our trade mark for industry. Anyone who could sell, it was said, was sure of financial and social success so the sales field attracted the young men, the ambitious men, the men who aimed to make their fortune in a hurry.

As a result we saw, during the years from 1919 to 1929, a phenomenal growth in which we term sales agencies.

In the fields directly or indirectly touching warm air heating, this growth of the specialty sales organization brought about a condition where accessories such as oil burners, domestic stokers, control apparatus, humidifying devices, and small air conditioning equipment went to the specialty sales organization rather than to the established warm air heating dealer.

This movement did not go on in spite of all we could do to stop it. The truth is that these articles were in such demand the ambitious manufacturer was forced to find an outlet which could devote the major portion of its time to the sale of his product. If he was content to see his product go through channels which were slow, but sure, he was left far behind in the race for industrial supremacy.

Today, however, this picture is changing rapidly. This is no longer a salesman's market—but a buyer's market. People are not buying on the strength of an aggressive sales presentation, but are buying because they need the article or because it offers economies which they must take advantage of.

This change from a salesman's market to a buyer's market has thrown the specialty organization all out of kilter. It cannot maintain that volume which made the organization profitable and satisfied the producer. The result is that the mor-

tality rate among specialty organizations has increased tremendously, leaving the field wide open for a new sales policy.

This new sales policy is—that in good times and bad, stability of distribution is more important than short spurts of volume sales and periods of no sales at all.

Practically the only channel through which this stability can be obtained is the established business man who does not depend exclusively on the sale of one product or one service for his existence.

Such an agency is the warm air furnace dealer.

The average furnace and sheet metal shop has always done a variety of work. The industry was raised on gravity furnace installation. Most shops will take and are reasonably well equipped to do any kind of sheet metal fabrication from the smallest repair job to the large ventilation contract. Thousands of shops manufacture and sell specialties of all kinds.

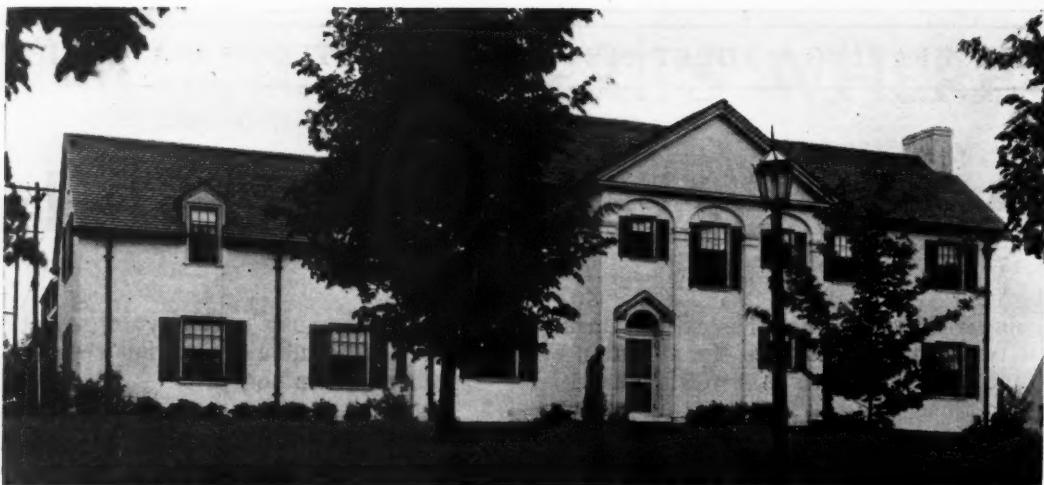
Year by year the industry has worked to iron out seasonal peaks and depressions with off-season services with the result that while we do not claim to be depression-proof we are not closing up shop because one line of activity is closed to us.

Merchandising methods and ideas have been so widely adopted that every community has its representatives actively selling, canvassing, advertising and displaying their products and their services. This progress has been a steady, year in and year out growth. Today our dealers compare favorably with the best merchandisers in the plumbing and heating, electrical contracting, or any building supply activity.

Our dealers offer any manufacturer, regardless of what he manufactures, a stable outlet which was here yesterday, is here today and will be here tomorrow. We do not claim that in direct competition we can sell as many oil burners, water heaters, controls, or other specialties as the exclusive agency, but we do claim that year in and year out our dealers will show more consistent, more satisfactory results than the specialty shop.

Let it be remembered, too, that the public is intensely interested in this proposition. They have been embittered by sales tactics which promise much today and are not here to deliver tomorrow. People are interested in buying from men they have known for years, who represent citizenship in the community, and who represent a service where the sons will be present to carry on tomorrow.

This need for stable distribution is offering vast possibilities to the warm air furnace dealer who can and will sell.



This Syracuse, N. Y., Installation Shows The Adaptability of Forced Warm Air

THIS article describes a forced warm air heating system recently completed in Syracuse, N. Y., which has in its design a number of features which make the installation of unusual interest.

The house is owned by Mr. E. B. Salisbury and was designed by Dwight James Baum, architect, New York City. The heating installation was designed and installed by the home office of the Kelsey Heating Company of Syracuse.

Although this is not an especially large house, the location and architectural features made the installation of a satisfactory heating system a decidedly analytical problem. The house stands on an elevation overlooking the city and the lake and presents its wide front to the strong directional winds from the west, north and northwest.

The service quarters are some-

what separated from the main portion of the house and are located at the extreme north end. Because of the location, a separate ventilation system was used in connection with the heat supply to these rooms.

Piping System

Much of the area under the house is unexcavated which entailed cramped duct work for the larger portion of the piping system. Just where this unexcavated area lies shows in the basement piping plan. The area begins under the stair hall and dining room and extends to the end of the house under the living room. Under the central portion earth was removed for a distance of 2 feet 6 inches below the joists to permit bringing through the large central return and the master section heat supply system.

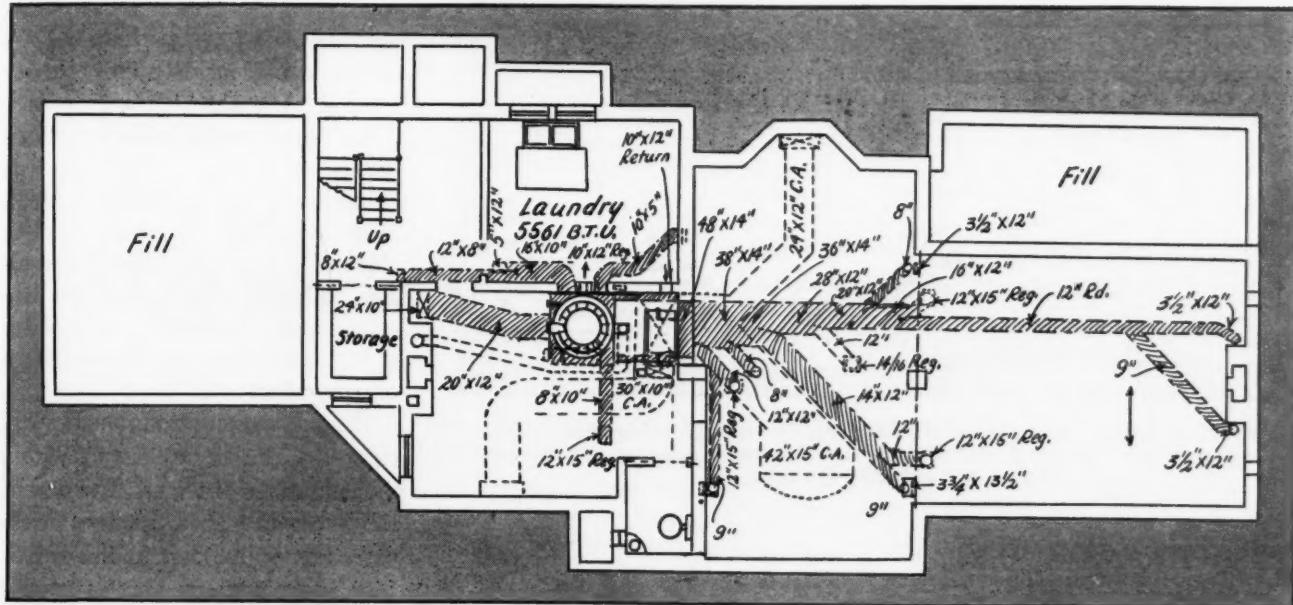
The piping plan shows that sup-

ply is so designed that one large, multiple-branch main and four small branches were used for supply. The large main traverses the unexcavated area and is branched to reach the various room risers. The supply system is designed for low velocities with approximately 9 square feet of leader pipe carrying 3600 c.f.m. at low speeds to give just under 400 feet per minute velocity in the mains.

On the first floor plan the supply system for the second floor servants' quarters is shown. From the heater a large riser 24 by 10 inches is brought up to the level of the first floor ceiling and then across the rear hall and the garage ceiling. At the top of the riser the main is divided into two 12 by 10 ducts which supply branches as shown. One branch heats the garage and the other the service rooms above.

In designing this heating system the Kelsey Company was faced with such problems as unexcavated areas, distant groups of rooms, large rooms, and severe exposure. Forced warm air has met every problem in a manner satisfactory to the owner.





Because of the large size of the house, the basement piping system has numerous long branches from five trunks and traverses both excavated and unexcavated areas under dining and living rooms

The heating system is designed with all return taken from the first floor. Because of the architectural arrangement, most of the return air is taken from the central portion—dining room and stair hall. This hall is a large room with an open stair well which also occupies a large area of the second floor. Most of the bedrooms open rather directly into this second floor hall.

At the base of the circular stair case, a large return air face with 630 square inches of area was

placed in the floor. This will serve the second floor rooms, the stair hall and the living room which opens into the hall through an arched door.

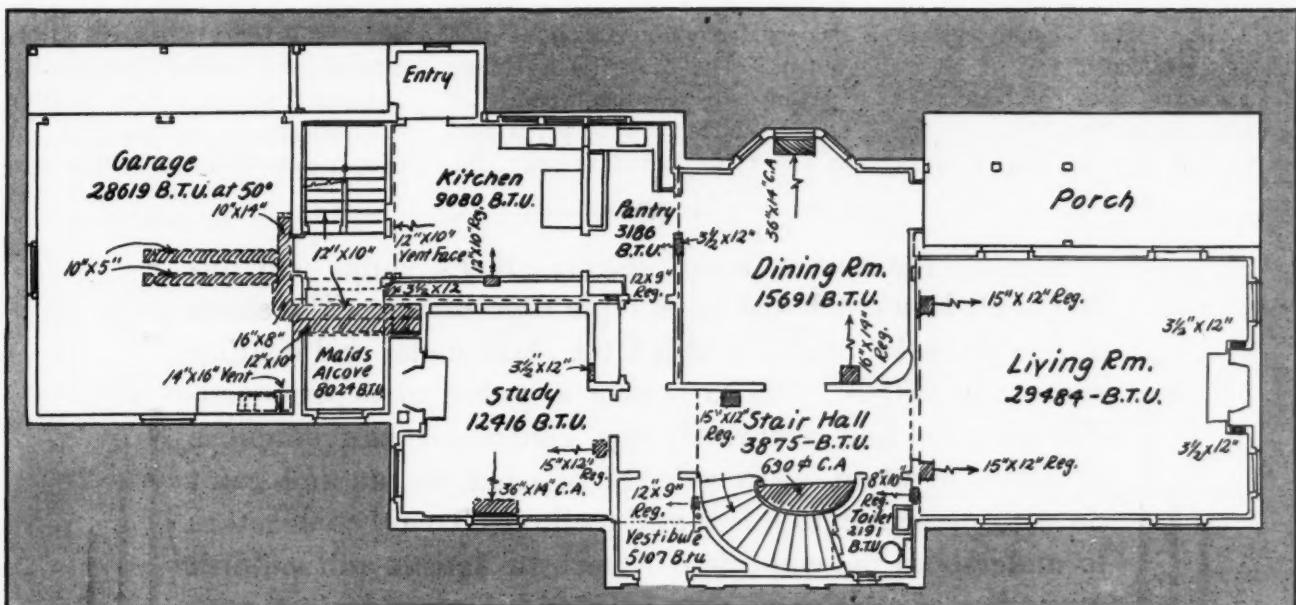
Another return air grille is placed in the study against the west wall and a third in the dining room. Thus the majority of the return area is placed to the side of prevailing winds and greatest exposure.

Registers and Grilles

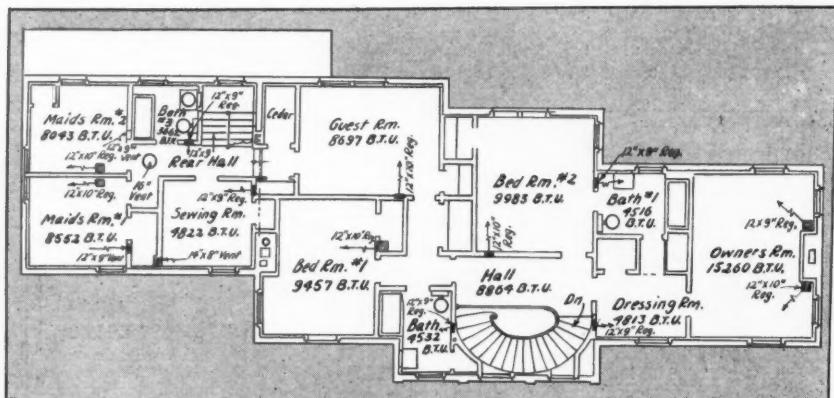
In the supply system both floor and baseboard registers are used.

Generally speaking, these inlets are so placed that interior air movement caused by outside wind pressures work with distribution rather than against it. For instance, in the living room two floor registers are placed to the west and north, in the dining room to the west, in the study to the west, also the kitchen.

On the second floor this same plan results in west and north locations in all rooms excepting the master bedroom where two floor registers are connected into risers



The return system is probably the feature of the first floor layout. Note the few, but large, grilles. Supply is generously provided for by large floor registers



No return is taken from the second floor, the central hall being used for return. The interesting feature of this floor is the separate ventilation system used in the servants' quarters

which use spaces in the chimney. On the second floor all rooms, even such small ones as dressing rooms and extra baths have supply.

Service Ventilation

On the second floor the service quarters above the garage are located farthest from the heater and are also exposed north and west. Because no direct return was made to the heater, air bound conditions were eliminated by providing an attic space exhaust for these rooms.

The arrangement shows on the second floor plan. The system also exhausts from the garage. The sewing room, two maids' rooms, bath and rear stair hall each has a vent stack which empties into the attic. The attic space is exhausted by a roof gravity ventilator of 16-inch size, which should exhaust about 23,000 cubic feet of air an hour at five miles per hour wind velocity and no temperature difference. The input in cubic feet per

hour to these rooms may be figured as just under 45,000 cubic feet at a temperature rise of 70 degrees and a total B.t.u. loss as shown on the plans. To balance supply and exhaust a 16-inch variable speed fan was installed in the vent lines which increases the exhaust to 42,000 cubic feet per hour at top speed. This gives an air change every ten minutes in the service quarter.

The owner reports that regardless of outside wind or temperature conditions these rooms were so well heated that some damper adjustment had to be made to cut down the rapid temperature rise to these rooms.

Operation

The equipment used in this installation is an important factor in the satisfactory operation of this system. The heater is a Kelsey Conditionaire gas-fired unit. A number 721 Silentair blower is used as a part of this heating unit. The

capacity of this blower at low speed is 3600 cubic feet per minute. A canvas collar insulates the blower from the furnace.

Air cleanliness is assured through the use of a fibre air filter which is so designed that by moving a small lever the fibre elements can be changed. One unit contains sufficient filtering area to last for approximately two years. The filter is separated from the blower by a canvas collar.

Humidification is automatic and controlled so that any setting within the limitations of the construction of the house can be maintained without effort on the part of the owner. Similar trouble free control is used for the blower and burner in a customary hookup. In this particular house 45 per cent relative humidity is being maintained through most of the heating season.

When the system was first operated, manufactured gas was being used. To meet the effects of this gas salt glazed Terra Cotta linings were used for the flue. Natural gas was introduced a short time after operation began. The lining is brought down below the cellar floor and has a drain connected to an outside dry well. The smoke pipe is special metal to offset gas and acid effects.

The installation illustrates very well the conditions encountered in large-sized houses where air conditioning is being purchased. Overcoming these problems in the most economical manner without sacrifice of efficiency or service calls for adequate knowledge and experience.

◆ ◆ ◆

Cooling for homes, small stores; offices, shops will undoubtedly be a much discussed topic this summer. The share of this potential business which the sheet metal and heating contractor will be able to secure is going to depend considerably on how accurately the contractor can diagnose conditions and on his knowledge of what he can and can't do with present equipment and methods. To aid contractors to understand the conditions American Artisan will publish a number of articles during July and August dealing with all phases of cooling in these different types of buildings.

Additional Information For Mr. Kitchen's Article On

Comfort Cooling For Homes

QUIET a number of letters were received from readers asking for additional information relative to Mr. Kitchen's article on Comfort Cooling for Residences published in the May 9 issue. Among these questions which we could not answer directly are the following:

"Is the water and air chamber separated from the ice chamber and how do you control the rate of ice melting?"

Mr. Kitchen says:

"The return water from the spray chamber in this case passes or drips over the ice which is located in the lower compartment of the cooling unit. The air does not at any time come in contact with the ice. The rate of ice melting is controlled by varying the volume of air in circulation. Obviously, if the volume of air is reduced by closing off the supply registers, the spray water will not absorb as much heat in the spray chamber and will return to the ice chamber in a colder state, thus decreasing the amount of ice melted per unit of time. The volume of air handled in this installation may also be controlled by the three speed Capacitor type motor used to drive the fan."

A second question was: "How many spray heads are used."

The answer is: "The spray chamber through which the air to be cooled is drawn is provided with three centrifugal type spray heads each handling 5 g.p.m. and connecting to a one-inch header."

A third question: "What is the approximate size of the cabinet used in Mr. Kitchen's house. Mr. Kitchen says:

"The approximate size of the cooling unit in my residence is 4x6x5½ feet high."

The next question is in the form

of a problem and asks: "What would be the size for a unit capable of cooling 10,000 cubic feet of space." Mr. Kitchen says:

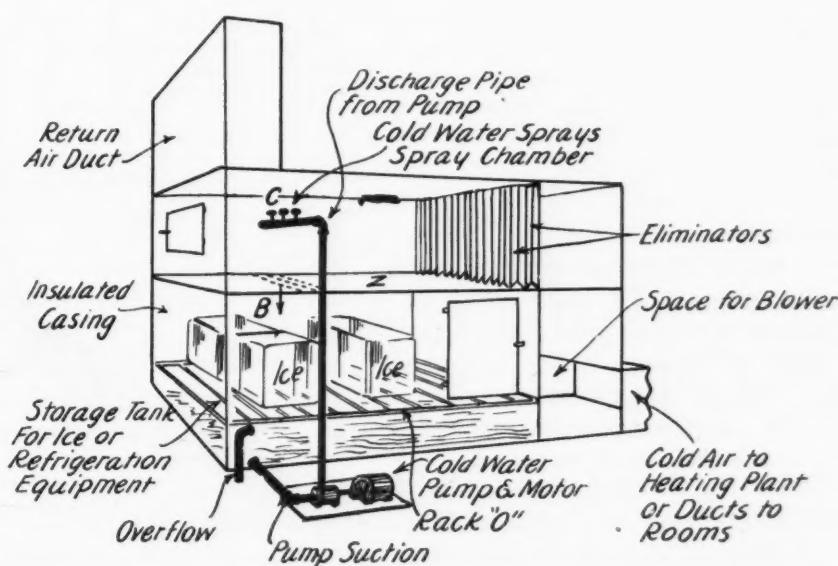
"You ask for the appropriate size of cooling unit for 10,000 cubic feet of space. We can only answer this hypothetically. There are too many unknown factors involved to reply off-hand. It is necessary that the construction of the building be given, the number of windows, exposure, whether this is a residence or other type of building, number of people using the building, etc. As closely as we can determine, however, a unit approximately 54x73x57 inches high or 83 inches high, if including the fan on top of the unit instead of intermediate between the unit and the furnace. The amount of ice used would average 140 pounds per hour, throughout the average summer season of ninety to one hundred and five-degree weather. This, of course, would be based upon the number of hours the cooling unit was operated.

Such a unit would require five spray heads, 5 g.p.m. each, the pump having a 1½-inch discharge against 50 to 55-foot head."

Mr. Kitchen also adds:

"Since the cooling unit in my residence was installed, there have been quite a number of developments, including automatic controls.

"I might further add that the cooling unit in my residence is more horizontal than the vertical type, which was later adopted for economy of floor space and for greater compactness and for another reason, namely, convenience of handling in and out of the average doorway. It was necessary to develop a plan, therefore, of building this in sections or telescopic form, for ease of handling and for a lower assembling cost. In many cases these cooling units will be installed in buildings already built, hence any unit should be convenient for handling and in small enough sections to pass through the average door."



This drawing shows the general construction and assembly of an ice cooling cabinet such as was described in the May 9 issue. Spray chamber is entirely separate from the ice cabinet. The unit can also be made high and short.

People will see

Not the new paint job
Not the new screens
Not the new awnings

But—that sagging gutter or broken downspout.

That's the way people are. One thing wrong and it's all they'll see. There are other reasons for taking care of defective gutters and downspouts. You can't afford to have unsightly water stains on building walls—nor washed out areas in flower beds.

Send the return card. If received by us on or before July 1 you will have 10% deducted from the cost of the job. Fill out the card now, while it's in your hand.

A Return Postal Card Campaign for Sheet Metal Jobs Around the Home

IN this month's, and next month's, issues of AMERICAN ARTISAN our readers will be given a campaign designed to secure replacements of defective gutters and downspouts, flashings, and also to promote the idea that there are a number of additional uses for sheet metal to which the home owner has never given consideration.

In our campaign on furnace cleaning we went exhaustively into the necessary preliminaries of a good campaign. We spoke of mailing lists, of various types of mailing pieces, of personal selling, and so on. Therefore, these matters will not be gone over again in connection with the present campaign.

One thing should be borne in mind. Although we are now talking about an effort to secure sheet metal work, that contractor who has put through the cleaning campaign will find less sales resistance to his

The card above is one face of a four-face postal card. The back side has your prospect's address. This card attempts to call attention to the cheapening appearance of leaky gutters and downspouts





Most housewives get several pieces of direct mail literature every day. Your offering must compete with other material which may be more striking to the eye, or offer something which the housewife now wants. If you can't send more expensive cards your next best plan is to send simple cards one after another. That is the scheme of the plan outlined here

present effort. Each successive advertising effort gains strength and momentum from every effort that has gone before it. It's like physical exercise—the effect accumulates. This is due to the fact, of course, that the process of keeping the firm's name before the community through each campaign does something to give that firm name a dominant position in people's minds, until the mere mention of it is suf-

ficient to stir a recollection of the various services that have been offered in the past. Momentum is worked up and the returns grow better for each dollar properly used.

This campaign for sheet metal repairs around the home is based upon a central idea which has been tested by numerous contractors and found suitable for the needs of our industry. The idea is that constant and repeated direct mail literature

sent to a group of prospects usually results in a return which makes the effort well worth while.

These contractors have found that a return postal card campaign brings excellent returns this year. The advantages of such a campaign are many. First, the cost of the campaign is small. Second, these cards can either be mailed or the cards can be placed in mail boxes by neighborhood boys. Third, such a campaign gains impetus as the cards of the campaign appear in the home owner's mail box week after week. Fourth, these cards can be prepared by any printer, no matter how small or inexperienced in advertising typography he may be. Fifth, small variations in the wording can be made without upsetting the appearance or effectiveness of the cards.

Six Card Series

Because these return postal card campaigns have proved business getters this campaign will be based upon a series of six cards—each one to be a double card, with return card to make it easy for your customer or prospect to reply. The first three cards are restricted to copy selling the idea of replacing defective gutters and downspouts. The idea most strongly stressed is that of the damage done by leakage from such defective equipment—and the argument of appearance is

The card to the right is another of the series you can send out to get gutter repair work. Its motive is FEAR indicated by listing all the things which may happen to the prospect's house if leaky gutters are permitted to go through another season. Note that a discount is offered for work received NOW

You don't care what the average annual rainfall is in your city

—that is, unless some of that rain is damaging your building. If you have defective downspouts or gutters—you're in for trouble or repairs. Leaks will rot wood surfaces, crack stucco, seep around foundations and cause settling—these are just some of the things you're letting yourself in for unless your guttering is whole—and they all cost money.

Avoid these big repair bills. Send the return card now—while it's in your hands. If received in our office by.....you'll be entitled to a 10% discount on work done. We'll meet your convenience as to the time you want the work done.

**A lot of rain falls on an average residence
roof of 1,200 sq. ft. area**

—and if it isn't carried by gutters and downspouts into the storm sewers it will—just see what it may do—stain outside walls, rot wood surfaces, cause cracks in stucco, seep around foundations and cause settling, cause "heaving" of basement floors, wash out flower beds.

Don't take a chance on incurring expensive repair jobs because gutters or downspouts are leaky. Have them fixed now.

**Send the return card. If received by us on or before.....
you will have 10% deducted from the cost of the job. Fill out the
card now, while it's in your hand.**

To the left is a card on gutter work which fits in with the other cards you will send out. If possible, all three should be mailed so that your name will be placed before the home owner once each week while your campaign is going on. You don't have to include the discount.

One side of every card must have some notation which is easy for the receiver to fill in and drop in the mail box. Here is one such return notation asking you to send your representative. When these cards are received phone the sender at once and acknowledge it. It is also a good plan to phone a few hours before the time specified to be sure your prospect remembers sending the card

**ADVANCE SHEET METAL CONTRACTORS,
NO. 5 MAIN ST.,
CITY.**

I would like to have your representative call.....(insert day) to give me a figure on repairs to

Downspouts Gutters

Flashings

(Name)

(Address)

made the basis of the copy for the first card.

The next card is designed to tell people just what flashings are and what purpose they serve. The fifth and sixth cards embody an endeavor to create work for the sheet metal contractor in a direction in which home owners have thought very little. There are a number of men in our field who have managed to secure a nice volume of profitable business on the items mentioned in these last two cards—flower boxes, curbing, etc.

You will note that we have included in the copy an offer of a 10% discount if the cards are received by a certain date, to be set by you when the cards are printed

for your use. We do this because one contractor, who has very successfully used postal cards, has found such an offer effective. If you use it, you will want to consider it in your estimating. If not, it can be dropped from the copy.

It is our recommendation, to the contractor who has an advertising appropriation which will permit it, to mail one of these cards each Saturday to at least the better class of prospects in his mailing list. By the time the next issue of the ARTISAN reaches such men, the copy for newspaper advertising and for sales letters which will dovetail nicely with the mailing of the last two cards will be available. For the contractor who does not feel

that he can afford to mail all six cards in the next six weeks, we suggest that he select the one which he thinks will produce the most business for him, and send that one—or two—out.

Once more we recommend a careful follow-up of all inquiries. And another step may be taken which should increase the effectiveness of the mailings. Get on the telephone to those people who receive the cards and who, you know, need the type of work described. If you time your telephone call for after the receipt of the card, and while it is still fresh in the minds of these people, it will help bring up the total number of sales secured.

Postal card campaigns have been found highly successful. After all, the unit of sale involved in the type of work covered by the cards in this article is not very large. The brief copy, the ease with which the prospect may return the card, the relatively small amount of money involved—all these things make it seem logical that good results can be secured. And the contractor who is called in to make a repair to, let us say, a gutter, will have the opportunity to see what other work ought to be done at the same time.

Somewhere ahead—just when, no man can say—lies the upturn in business. But that it will come is quite certain and that it will be substantial is not to be doubted since

Return postal card campaigns have been used with splendid success by all kinds of businesses. Such campaigns are cheap, they have the value of continuity and permit you to call a variety of services to the prospect's attention. In the July issue we will show other cards and some letters. Your local printer should be able to duplicate all these cards at low cost. If he can't, write us.

buying has been at such low levels. A great many things will have to be replaced. There will be remodeling and new building. The point about this observation is this: The man who can, by some hook or crook, keep his name before the public now, will be out in front when the upturn comes. He will have an advantage over those men who are doing nothing now to keep their names before their communities. This is an advantage to be borne in mind in thinking over an effort such as we are recommending in this issue—it will have its immediate effects, and it will have this other and very desirable one of being among the business men who have not quit, but have kept up some momentum.

We do all sorts of interesting things with sheet metal

Did you ever think how much coal dust would be kept out of the basement if the coal room were lined with sheet metal. Good time to do it now, while the coal supply is low. We've put in cheerful basement ceilings; we've made driveway curbing, and curbing for flower beds—and window boxes! You've no idea how smart such things can be fabricated from sheet metal.

Send the attached card. We'll give you full details in person, and for such fabricated jobs we're making a special discount of 10%, on cards received by..... Send yours now.

Roof flashings—know what they are?

Where the chimney joins the roof, where gables form valleys, where porches or bay windows join walls—there you have a place where rain water will get through and stain ceilings and inside or outside walls.

Which makes flashings rather important gadgets—wouldn't you say? If you've the smallest stain, now's the time to replace flashings and save decorating cost.

Send the return card now—while it's in your hands. If received in our office by..... you'll be entitled to a 10% discount on work done. We'll meet your convenience as to the time you want the work done.

In your campaign be sure to say a word about flashings—you know how vitally important they are, but your prospect doesn't. Any home which has loose flashings or flashings which need repairs can well afford to use your service. This card calls flashings to the owner's attention

"Vesterport"—World's Largest Metal Surfaced Commercial Building



The exterior walls are metal and glass with unique construction used to lock and fasten the sheet sections in place

Vesterport, shown below, covers an entire city block. The vast expanse of walls is all sheathed in copper. The structural frame is boldly outlined behind copper facings

COPENHAGEN, Denmark, has the distinction, according to the Copper and Brass Research Association, of possessing the largest commercial building in the world completely surfaced with

metal—in this case copper. The building is known as "Vesterport" and was designed by Ole Falkentorp. The structure occupies an en-

tire block of ground in the business district.

The building is seven stories high, with two sub-stories and an engine room and a total height of 70 feet. The exterior facings, including the roof, have a total area of approximately 15,000 square meters (16,140,000 square feet). Some 17,600 copper sheet sections were used to cover this area. The weight of the copper used exceeded 240,000 pounds. On the roof and sides 20-ounce copper was used, while the gutters and downspouts are 24-ounce sheet.

In general design and application, the methods of fabrication and installation follow American practice excepting in some special instances. Standing and flat locked seams were used, similar to our practice, but in the methods of holding the copper sheeting to the wall considerable



variation from our methods was employed.

The Walls

Probably the most interesting feature of the building is the application of the copper wall facing. Most of the details of this application can be obtained from the photographs and the detail drawings. The design in general emphasises the structural frame of the building, with columns and girders forming the outside line of the face and having the facing panels of copper sunk behind the face line.

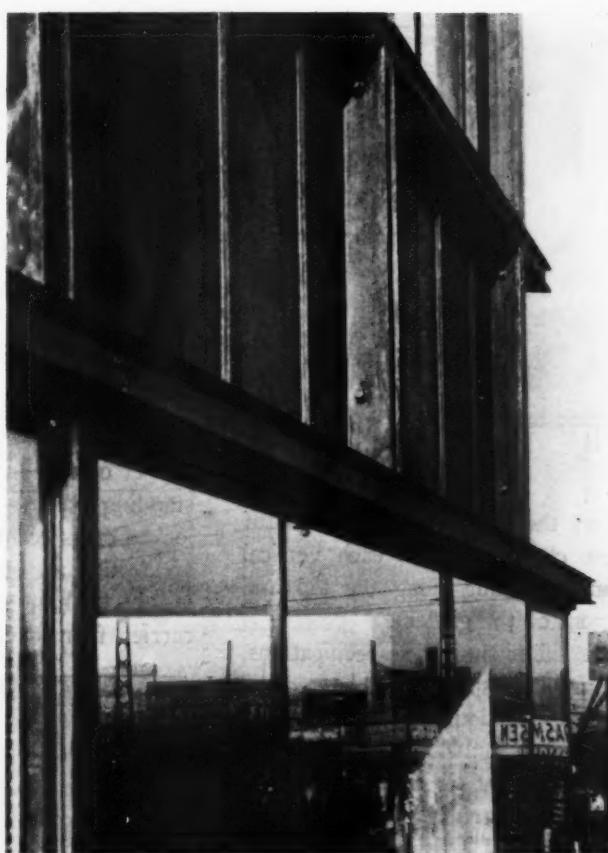
The walls are composed vertically of alternate panels of glass and copper as shown in the elevation



photographs. Each sheet panel is composed of four sheets held together by vertical standing seams similar to American practice. An interesting detail occurs at the columns. The outside sheets of the adjacent panels are turned at right angles and carried out to the edge of the column. Along the column face a narrow sheet turned for standing seam locks at the edges is placed and locked to the sheets from adjacent panels. This gives a complete copper facing, pierced only by two column bolts which show in one of the photographs.

The copper sheets also cover the girders which divide the face horizontally. The construction over

This closeup of a wall section shows how the metal is formed around the structural members. The picture also shows the standing seams—vertical and horizontal—which are used



along both standing seams is made when the sheet is locked.

This view of a deck shows fabrication around a window and below, also the parapet backup and flashing

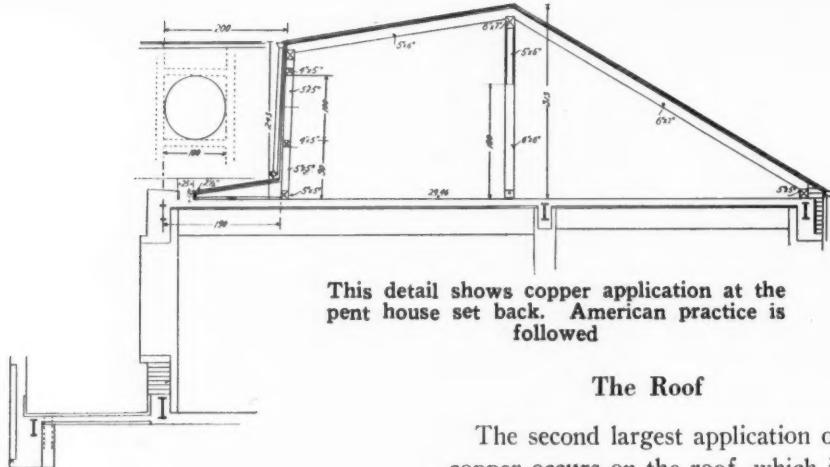
these girders is similar to the facing on the columns—a ledge sheet carried to the upper edge of the girder and an under ledge sheet from the panel below carried to the lower girder edge. A narrow facing sheet is locked with standing seams to these sheets to again form a facing. Cross seams on both the columns and girders are flat locked and soldered for tightness.

One of the photographs shows a closeup of a window at a deck. The construction around this window is typical of the facing construction and illustrates another point not mentioned. The face sheet of the columns and girders is turned short of full face width so that a slope

In the window panels side sheets and top and bottom sheets were used. All these sheets were carried out to the face of columns and girders to terminate in construction similar to the facing in full sheeted panels. The window frames are all steel frames of the swinging type with two panes to a sash. Operating mechanism is bronze. More than 1,300 frames were required for the building.

Locking Cleats

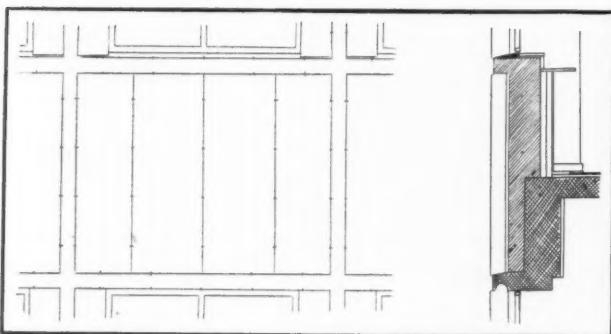
In order to hold the copper sheets to the building wall the mason was furnished copper cleats about 2 inches wide and long enough to be embedded in the masonry and project out far enough to become a part of the standing seams of the panel. Approximately 30 of these cleats were used in a full copper sheathed panel and about 20 cleats in a window panel. These cleats were cemented into the masonry by the masonry contractor, but were cut and adjusted by the sheet metal contractor. One of the details



shows the approximate location of these cleats—four to each vertical seam and four along the top and bottom of the girders.

In submitting the specifications, the architect specifically covered the sheet application by specifying that all sheets should be free from any buckling, must lie close to the wall and that all surfaces should be absolutely level. This meant that all buckle and roll had to be taken out of the sheet before it was placed on the wall. Seams were specified to be exactly vertical and straight without any wavering.

In general, these specifications were planned to make the sheet metal contractor exceedingly careful of his application. Where any exceptionally exposed points occurred, the specifications called special attention to them. For example, it was realized that one of the weak points of the facade would occur where the panel sheets were turned down to form the ledges over the girders. Seams at these points were detailed with care and the specifications stated that each seam or "fold" should be absolutely watertight.



This detail shows the location of the holding cleats for a metal section.

The second largest application of copper occurs on the roof, which is standing seam design with flat locked cross seams. Details of this application are shown in the photographs. These standing seams are carried from eave to ridge, but are

The Roof

All valleys on the roof are formed in one wide sheet with standing seams joining the valley sheet to the roof sheets. On narrow valleys, the valley sheet is really a flashing sheet and is carried behind the roof sheet.

The construction of the roof is radically different from American practice. The sheathing under the copper is of 2-inch lumber, laid on the trusses. Cleats, similar to those used on the faces, are used on the roof, but these cleats are carried between the boards and nailed with copper nails to the under side of the lumber. For the roof, the specifications again called for absolutely straight and vertical standing seams, which no doubt caused considerable



The vast expanse of Vesterport roof shows metal sheathing of high order.
Even the chimney is sheathed.

closed at the ends by turning the seam down in a long mitre. There is no ridge roll, but another standing seam is executed with the roof sheets.

hand work after the seams were locked.

That the copper sheathing was used for all parts of the building is indicated by one of the roof photographs which shows that the chimney, all pent houses, even the vent heads, were covered with copper.

Around all the set-backs or the roof, copper gutters are used. These were fabricated by the sheet metal contractor from copper sheet of 24-ounce. The general design and construction are indicated on one of the details which also shows that inside drains were used below the set-back.

...the problem corner

A Floor Draft Problem

OF all the problems the heating man is called in to remedy, floor drafts usually cause more complaint and annoyance to both owner and contractor than any one other problem. Probably the reason for this is because drafts are such fickle things—one day they are working at a great rate and the next you can't find them.

As a result, the average heating man either swears heartily when he runs up against one or else he gets all set for a real good time working out the problem.

The floor plan shown here is for a small house—four rooms on the first floor and two small rooms on the second floor. Just how small is indicated by the 18-inch furnace which heats nicely and by the double registers on the first floor.

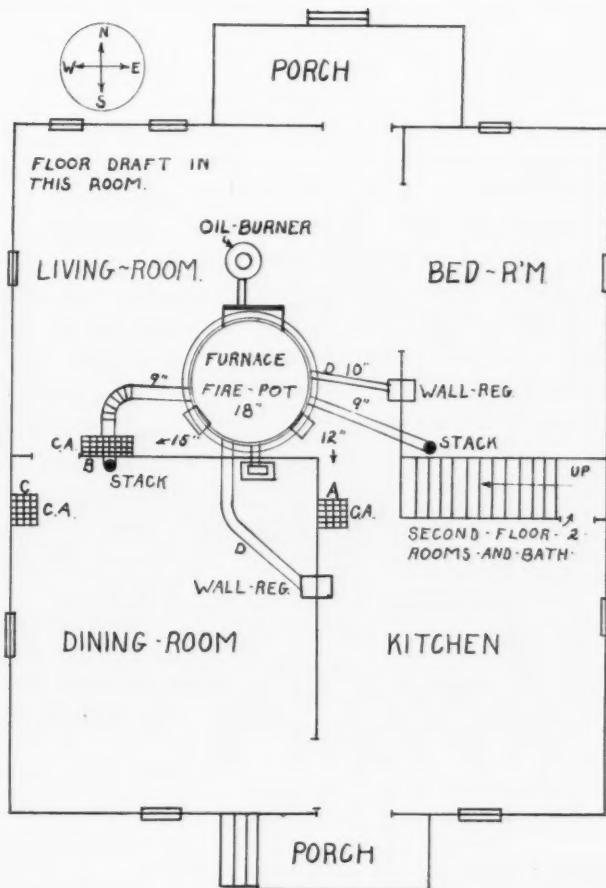
The contractor says that the draft is present in the living room.

Here is the contractor's outline of the trouble.

"This is an old job. The kitchen was always cold so I put in cold air face A. This relieved the pressure and eliminated the cold condition.

"Placing this cold air face A helped the kitchen, but does not eliminate the floor draft the owner complains of. This draft is most

This plan shows the arrangement of rooms on the first floor. There are two rooms above. The whole house heats satisfactorily, excepting that there is a disagreeable floor draft in the living room. A cold condition was overcome by installing return air face A but this did not eliminate the draft. An interesting feature is that the draft is most noticeable in mild weather



noticeable in the living room which is to the north and against the prevailing wind.

"A funny thing about this draft — IT IS WORSE IN MILD WEATHER."

Readers with experience in reme-

dying draft troubles are invited to send in suggestions on this problem. The contractor says he is willing to make necessary alterations on the system. He would also like to know what readers think is causing this draft.

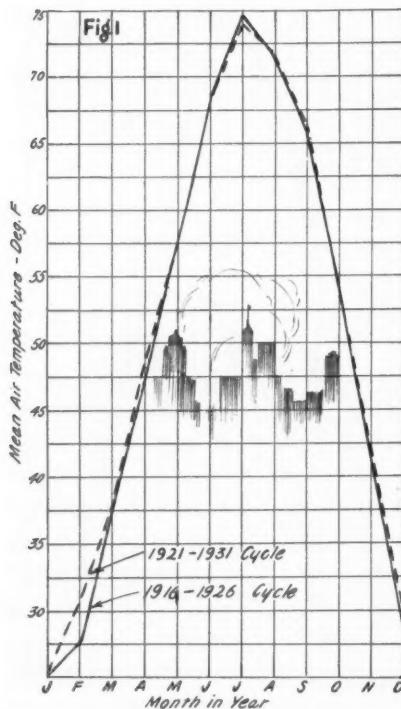
No doubt you have encountered and solved many floor draft troubles in your experience. If so, will you diagnose this case and send us your suggestions? A plan showing your suggested changes will help, too.

How Atmosphere Controls Temperature

By MALCOLM TOMLINSON
Consulting Engineer

AS LONG as we desire to live it is impossible to get along without the atmosphere which surrounds us. This atmosphere consists of air and air's impurities. It constantly changes due to variations in temperature, relative humidity, air motion and air pressure. Variations in pressure are of little importance except during the ascent of a mountain or the decent into a mine.

No one needs to consult the data



Weather cycles for the same locality are practically identical. Notice how closely those for Chicago check

of the U. S. Weather Bureau to learn that atmospheric variations differ with the locality. Everyone knows how the temperature varies as we go northward or southward but, as we shall see, few realize how atmospheric variations differ east and west. It is this difference which makes climate.

Let's see what climate means. A steel products factory moved from the southwest side of Lake Huron to the southwest side of Lake Mich-

igan. Immediately a rust film formed on the surfaces of the product. As the two locations were quite similar the management was surprised to learn that the climate of the former location was much drier than that of the new site. The average relative humidity was lower previously. Climate, then, is the average atmospheric condition which prevails in any given locality. It may be quite different five or ten miles away due to a large body of water or mountains or some other abrupt change in the physical character of the location.

Weather, on the other hand, is the state or condition of the atmosphere as to hotness or coldness, wetness or dryness, clearness or cloudiness and windiness or stillness. In nature this condition is constantly changing. On the other hand, when weather is produced artificially indoors, weather is, to all intents and purposes, fixed. Out-of-doors we have no control over weather.

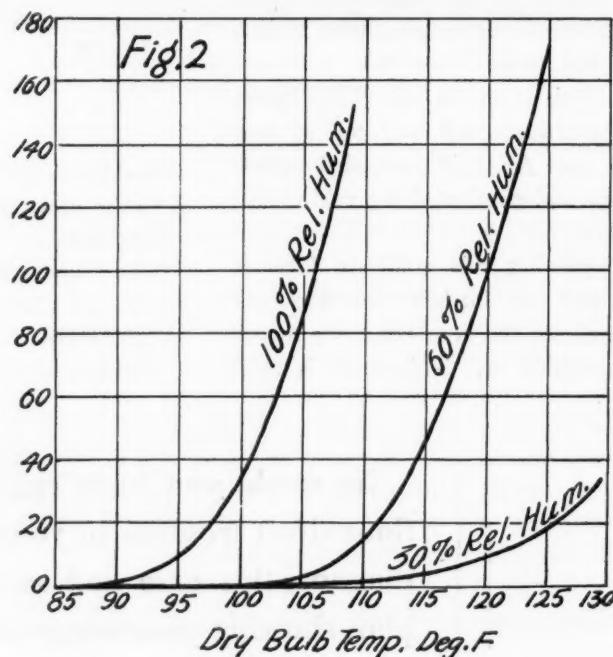
Much that we know about the weather of the colonial period and of the earlier days of the republic was obtained from diaries of indi-

vidual observations. Even today few localities have had continuous daily weather records longer than 60 years. This makes it somewhat difficult to furnish definite examples to prove that weather has not changed to any appreciable extent through the past two hundred years yet, as we shall see, this is a fact.

Weather Cycles

The shortness of weather records is no handicap as far as our industry is concerned. Like business, weather moves in cycles. These cycles are somewhat over 11 years in length but it is safe, for most calculations to assume an 11-year period. The weather cycle may be started with any day, month or year. All that is necessary is that the period be continuous for a complete cycle. The advantage of these cycles is that, for any given locality, they check with remarkable closeness for a full 11-year period as can be seen from the chart shown. This means that the average yearly precipitation (rainfall and snow), temperatures and relative humidities are practically identical as far as the

The pulse rate rises as the temperature goes up (shown by the rise of the wave lines). The chart also shows how high humidities affect the pulse more than the low



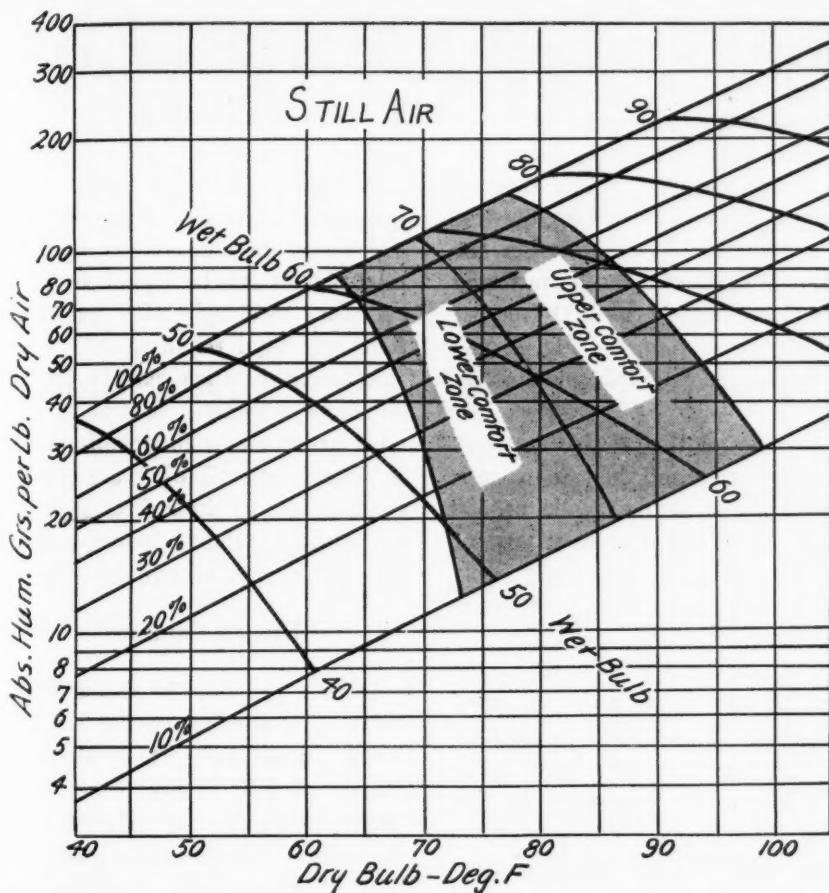


Fig. 3.—Tomlinson Comfort Chart. Select any point in one of the two comfort zones shown and, for the season indicated, you will get the comfort of spring

same quantities for other cycles in the same locality are concerned.

We should be greatly interested in these facts concerning weather since they are responsible not only for the ease with which fuel consumption and heat requirements are estimated, but also for human comfort and discomfort. The practical control of weather enables the heating industry to supply human comfort throughout the year.

We have seen that the heat in water vapor affects human comfort adversely under high relative humidities. Such humidities also prevent the normal flow of perspiration through the skin and its removal from the surfaces of the body. These three effects tend to raise the temperature of the human body above normal and to make human beings uncomfortable. The effort as shown in Fig. 2, gives a very clear picture of the combined effect of these three actions on persons. Here comfort is indicated by very small increases in the pulse beat

while discomfort is shown by the larger increases in the pulse. Therefore relative humidity is a vital factor in comfort.

It has been shown that air motion has a controlling effect on evaporation. The evaporation of moisture from the surface of the human body can thus be controlled partially through air motion which can also be used to give a cooling effect through speeding up perspiration removal. Thus air motion is another comfort factor.

Thermometers

The wet and dry bulb temperatures have a controlling influence on the relative humidity. Also the dry bulb indicates the heat in the dry air and influences the body temperature while the wet bulb is controlled by the rate at which evaporation can proceed. Therefore these two temperatures are also factors in human comfort.

To the four comfort factors men-

tioned can be added that of pressure which indirectly influences the relative humidity, the wet bulb and even the dry bulb. Nevertheless, as we have already seen, this fifth comfort factor, as far as a separate influence is concerned, can be neglected where pressures are practically atmospheric.

Considering wet and dry bulb temperatures as a single temperature factor, comfort thus is vitally influenced by four factors. At once we see that the same factors which are vital to weather are also of prime importance in obtaining human comfort.

With the four comfort factors considerable variation can be had without any marked change in the average sensation of comfort or discomfort. In other words, each one of these factors can be varied through a reasonable range without disturbing human comfort. Thus a comfort zone exists which changes gradually throughout the year due to differences not only in weather, but also in the clothing worn.

Comfort Charts

Through the research efforts of the American Society of Heating and Ventilating Engineers and the Harvard School of Public Health it is now possible to know what the relations are between these four factors and comfort. To obtain this information a great number of tests were made on many individuals.

While the data can be tabulated it is best visualized when plotted on a psychrometric chart where the limits of comfort can be clearly seen. To accomplish this purpose it is necessary to have a chart for each particular rate of air motion desired. The range varies, usually, from still air to 700 feet per minute—the practical limit for moving air in buildings without disturbance.

Two psychrometric charts are shown in Figs. 3 and 4. One is for still air and the other for 300 feet per minute. In these comfort charts for still air and 300 F. P. M. it will be seen that the comfort zone is divided into upper and lower

AIR CONDITIONING

zones. The upper zone applies to summer conditions and the lower to conditions which prevail in winter. Spring and fall would require a zone halfway between these upper and lower zones.

Comfort, it must be understood, varies with the individuals. Comfort charts and data can only apply to average conditions and people. In hospitals and other places where treatment for various ailments are necessary, comfort would require a different arrangement of zones on the comfort chart. In many such cases the comfort zone would be higher than the upper zones shown. Comfort also demands that the inside air conditioning be conducted in such a manner that movement of people from inside a building to the outside will not produce a shock. This means that the rise or fall of outside temperatures and relative humidities must be followed, especially where such rise or fall is abnormal, by the inside dry bulb and

relative humidity. In theatres special efforts are made to meet this situation by conditioning lobbies and exits to create a balance.

Some idea of the way these factors can be varied is had through the use of the dry bulb for illustrative purposes. At saturation the seasonal comfort zone is practically five degrees wide for 300 feet per minute air motion, see Fig. 4, and 8 degrees for zero air motion, see Fig. 3.

Now lower the relative humidity to 10 per cent and the same zone is practically 8 degrees wide at 300 F. P. M. and 11 degrees at zero air motion. These data apply only where people are slightly active, in health and normally clothed.

The use of the comfort charts may be seen through the following example. It is desired to maintain a 50 per cent relative humidity at 300 F. P. M. In winter the dry bulb temperature for this condition may vary from 77 to 84 degrees

and in summer from 84 to 90½ degrees. As the dry bulb for these two seasons and zero air motion would be 67 to 76 and 76 to 84½ degrees respectively it is evident that comfort with air motion requires more heat than with still air. Therefore the rate of air motion used should not be higher than is necessary to comply with specifications and legal requirements.

When the comfort chart is plotted on the psychrometric chart all of the vital factors controlling comfort can be found and all of the possible combinations of these three factors, temperature, relative humidity and air motion, can be quickly seen.

Human Comfort

It may properly be asked what effect each comfort factor has on actual human comfort. Examination of the two comfort charts will show that the dry bulb temperature, the relative humidity and air motion have a variable effect dependent on their location on the comfort chart.

For the sake of illustration take a location with a 76 degree Fahrenheit dry bulb, 50 per cent relative humidity and still air. A 10 per cent increase or decrease in the relative humidity will change the dry bulb only two degrees if equivalent comfort is to be maintained. Therefore, for this location, a degree change in dry bulb temperature has five times the effect of a per cent change in the relative humidity on either comfort or discomfort.

After all, the air supplied by nature is not as clean and healthful as most people imagine but, through mechanical control, it can be supplied in a condition and in a manner superior to anything possible under continuous natural conditions. Furthermore this artificial air can be adjusted to meet individual needs and requirements in such a way that the human being can be protected against dust, fumes and even bacteria. For this so-called artificial air is nearer to pure air than anything known to man previously.

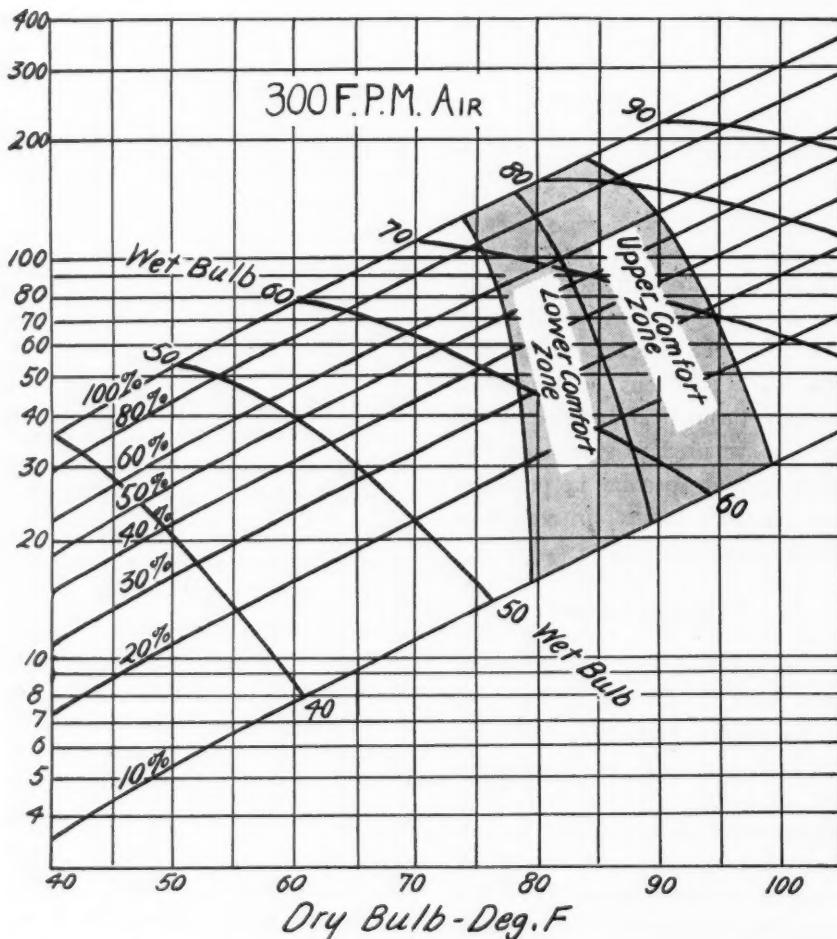


Fig. 4.—Tomlinson Comfort Chart. Moving air pushes the two comfort zones up for all humidities because higher temperatures have been made comfortable

FAN BLAST ENGINEERING

by PLATTE ENGINEERING OVERTON EDITOR



THE FALLACY OF ONE THERMOSTAT CONTROL

THE fact that the installation of a thermostat will further improve a well designed warm air gravity or mechanical system is a matter scarcely open to question. However, it should be remembered that any one thermostat has its maximum area of service and cubic feet of space for which it will fulfill its office.

The area that may be correctly controlled for a uniform temperature depends on conditions. These conditions will be discussed in the following paragraphs. The location and height from the floor are merely two of many important items.

No matter how carefully we consider the heat loss, exposure and infiltration of any given area of a building, these items will vary from day to day and they vary even from hour to hour. Our data sheet may show that the prevailing winds are from the northwest, but as a matter of fact they may blow from the southeast at times, perhaps in the most severe winter weather.

For the average mechanical system with one or more trunk lines, but one temperature of air is available at the warm air register. Hence we assume an inlet temperature of 120 to 140 degrees and calculate the necessary cubic feet per minute at this temperature to offset the B.t.u. loss due to the glass, wall, ceiling, floors, leakage and exposure. If any one of these items should vary to any great extent—which, of course, they will if the wind should shift from the direction used as a calculation—our B.t.u. loss will vary and we will find a variation of from 5 to 10 degrees

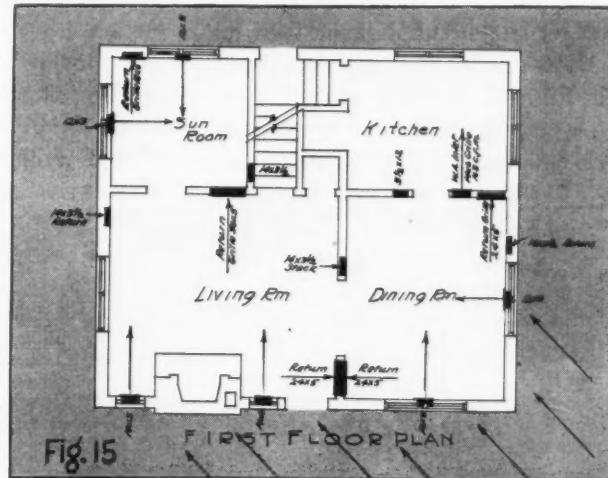
in the rooms that balanced to perfection but a short time before.

For the average home with the lower floor well opened by arched doors, our variation will be less. Fig. 15 is a typical plan with the above condition. Here one centrally located thermostat may maintain fairly normal and even temperatures throughout the entire house regardless of wind direction or leakage.

Fig. 16 is an example of the large rambling type of house and any attempt to maintain uniform temperature throughout this area with one thermostat is akin to driving nails

that we must volume the air to each room to conform with the heat loss requirements. A strong varying wind or one or two unlocked windows may vary the B.t.u. loss from that calculated or that loss experienced a few hours before. Say that the living room in Fig. 16 requires 768 c.f.m. at 120 degrees. If our breathing line temperature over-rides to above 70 degrees we must have some method of automatically cutting down the volume of air in c.f.m at the warm air register until the correct balance is reached to maintain 70 degrees or we must find some method of vary-

There are many houses of this type — first floor with rooms opening into one another through archways. On such a floor one thermostat may be used



into cobblestones. It just can't be done. A close and critical survey reveals obviously that every room shown on the plan except the kitchen and servants' quarters must have an individual thermostat. With the servants quarters one trunk line with one master thermostat carefully located may suffice.

For any one given trunk line with one average temperature throughout the length of the duct, it follows

ing the inlet temperature at the inlet or register.

The first of these two methods—voluming the cubic feet per minute, or cutting down the air supply—is probably the cheapest. But it is far from being desirable for the ideal system. For such a method it is only necessary to install a positive cut off damper to open or close, in the branch that supplies the room in question. This damper is actuated

by the thermostat located in the room in which the temperature is to be controlled. Such a damper is shown in Fig. 17.

The objections to such control schemes are (a) when the branch is closed the rest of the ducts and branches are thrown out of balance and (b) when the room is at or above the desired temperature, the circulation so necessary to good air conditioning practice is eliminated.

The benefits of the above system may be said to be the advantage of heating distant rooms or those that are hard to heat. The rooms easy to heat are soon brought up to the desired temperature and the dampers in the branches to these rooms close. This throws the entire heater load on the distant or hard to heat rooms.

High velocities and too rapid air changes are also the results unfortunately.

Double Mixing Damper

This leaves us the second method which is the control of the inlet temperature at the warm air inlet or register. This is done with the *double mixing damper* and is shown in Fig. 18. It is, of course, necessary that both warm and tempered air are available, or a single duct

run from the plenum chamber with a by-pass from the fan. By tempered air we mean air at from 60 to 70 degrees.

In many installations two such dampers may suffice; one to each trunk line being so arranged that each will supply some section of the house where one central thermostat will maintain uniform temperatures in the several rooms on the one trunk line. The house shown in Fig. 16 must, of course, have a mixing damper for each of the rooms shown excepting the servants' quarters. If badly exposed

where every room was provided with temperature control *except* the bathrooms. These were to be controlled by a hand operated register. The owner going into his bathroom seldom found it to be the same temperature as his bedroom. When he took a bath or shower the hot water immediately raised the temperature of the room and the register had to be closed. Now the balance of the house was satisfactory and the last word in air conditioning, but to that owner the engineer who designed the system was a killjoy, a wet blanket, and a stomach ache.

A motor operated damper of this type is used to control volume. Dampers of this type are either full open or full closed

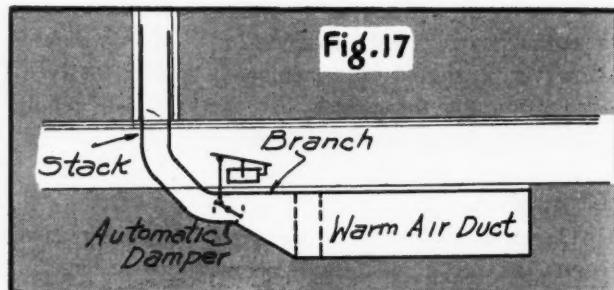


Fig. 17

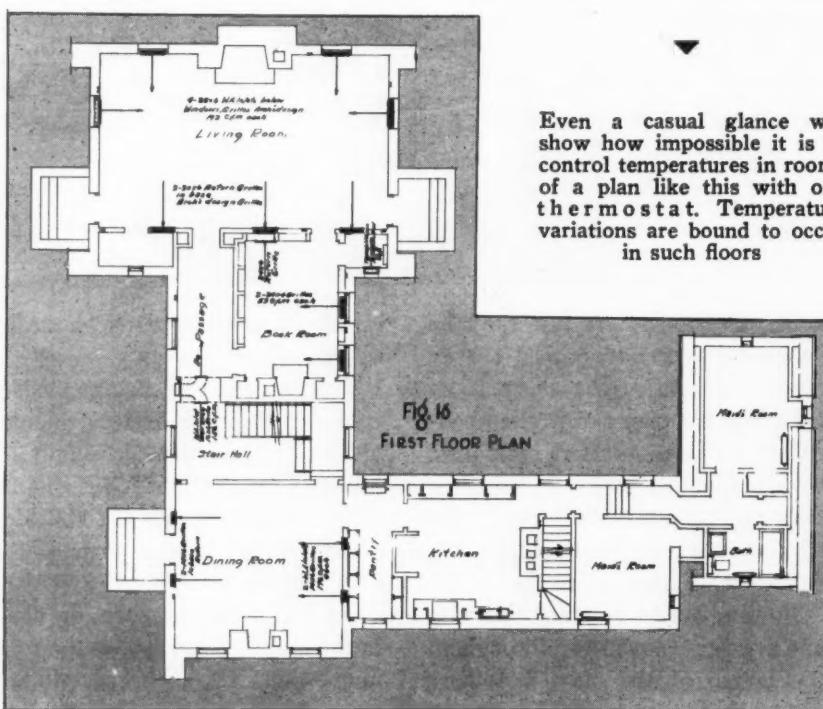
the living room may require two such controls. In houses of this type, and from the plans we would assume that this is a costly and beautiful home, the question of price for a good temperature control system should not be raised.

The importance of temperature control is borne out in the experience of the writer on a fine residence

No doubt every home has its "pet" room and woe unto that contractor who overlooks this important item. The servant's quarters may imitate the north pole or the kitchen the tropics. The hallway may contain a wind storm and the serving room be a "black hole of Calcutta"; but somewhere in that home is a room where the lord and master or the better half will retire to enjoy the fruits of air conditioning and that room must be 100 per cent plus. Find that room and wrap your air conditioning design around it.

The contractor who insists that the occupants must leave doors open to maintain uniform temperatures is admitting failure. Doors are made to be closed, that is why they are doors and not arched ways.

The occupant who has for any length of time been in a room where the temperature is 80 degrees and goes into a room where the temperature is 70 will believe that it is 40. Or if being in the 70 degree room say for 10 minutes he goes into the room where it is 80 he will swear it is 100. Even a thermometer will not convince him. Try it



Even a casual glance will show how impossible it is to control temperatures in rooms of a plan like this with one thermostat. Temperature variations are bound to occur in such floors

yourself and see the importance of uniform temperature control.

The location of the thermostat is highly important. We trust that this item of location will bring the response of many engineers and contractors. Your experience may be of interest to other contractors. No doubt many of the readers of this

The gradual action type of mixing damper is best suited for good air conditioning. This type of damper will have two or more positions between open and closed and allow a mixture of warm air and tempered air to pass into the duct at the same time. If the type of positive *open* or *closed* is installed,

to a hand-fired installation unless the draft control is perfect.

All expert opinion to the contrary, thermostats *may* be used for humidity control. Where recirculated water is used for washing and humidifying such water is soon brought up to recirculated air temperature or from 65 to 70 degrees. This is, of course, too high and the results are often over humidification with the resultant condensation on glass areas and cold walls. To correct this trouble, a small outside air supply duct may be run and tapped into the return air chamber in front of the washer. A thermostat set at 55-60 degrees—depending on the percentage of relative humidity desired—may be located at the fan intake or discharge. This thermostat actuates the cut off damper in the outside air intake and allows this air to mix with the return air and lower the temperature and prevent the dew point becoming too high. As stated, the setting of the thermostat will govern the dew point to a *considerable extent*. Such a hook up is shown in Fig. 19.

The average humidity "expert" will ridicule the idea of attempting to control humidity or the "dew point" with a dry bulb thermostat, but experience has shown that such application will show results consistently higher than the average humidity controls now being used. Such a system will, of course, function only in cold weather, but it is

(Continued on page 39)

article have had both sad and good results. Some have moved thermostats and secured the proper results; others in many cases, failed to make any noticeable improvements.

Duct Thermostat

Air movement, the sun, and open windows are a few of the items that will affect the performance of the thermostat. Let us take the case of the living room on the plan in Fig. 16. It might be possible to obtain very good results here with the location of *one thermostat in the return air duct*. This position has the advantage of (a) fairly constant temperature; (b) not affected by the sun rays; (c) the air will flow over the stat; (d) it will not be tampered with; (e) it will not be directly affected by a blast of warm air from the inlet, or a blast of cold air from some unlocked window or open sash.

The inlet temperature may vary from 70 to 135 degrees, but the return air in a well air conditioned room will never vary over one or two degrees for any length of time. If the proper wall space were not available I would not hesitate to try the above solution. This method is used in many cases in public buildings.

the inlet temperature will vary from say 50 to 140 in a few seconds of time and a blast of unpleasant cold air may pass over the occupants before it reaches and actuates the thermostat.

Where any system of temperature control dampers are used, the draft, oil burner, or gas valve, is in all cases actuated by a plenum chamber control. As more heat is called for due to the warm air dampers being open, the plenum chamber temperature will drop, and as the rooms come up to temperature and the warm air dampers close the temperature in the plenum will build up rapidly and hence close the draft, stoker or oil burner. However, such a system is hardly suited

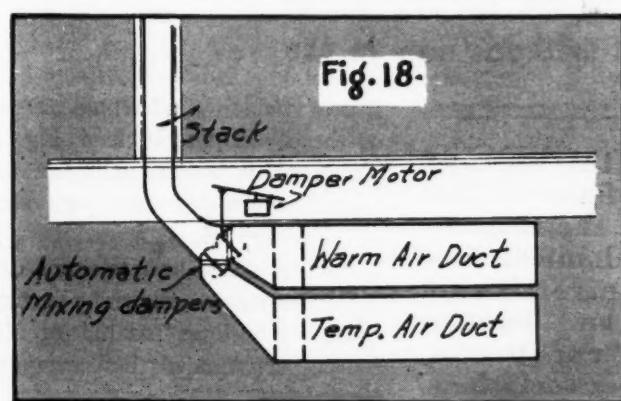


Fig. 18.

This shows the double plenum type of installation. One gradually moving damper admits warm or tempered air at the call of the thermostat. No blast of hot or cold air can occur

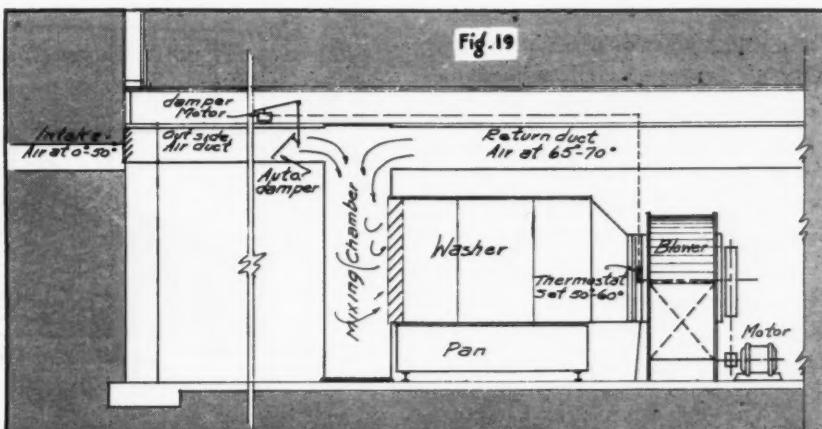


Fig. 19

Here is a plan whereby a thermostat may be used to control humidity. Admittedly such a control is not exact, but will work

Comfort Cooling For Homes

By H. J. Macintire

A series of articles discussing the basic principles of cooling and the application of present equipment and methods now in use

COMFORT cooling which has been developed during the last fifteen years has made it possible to keep theatres and auditoriums filled during the warm days of summer; dining rooms, first in hotels and then in restaurants, have added comfort cooling which has paid for the investment in a short period of time because of increased income; banks, stores and office buildings have found comfort cooling worth while because of the increased efficiency of the employees as well as the increased volume of business as the result of the improved conditions.

The problems of comfort cooling in residences was brought out clearly last summer by the sub-committee on heating, ventilation and air conditioning of the President's conference on home building. It was clearly indicated in this committee's report that the general problems were—first, the season was short for mechanical cooling of homes, except in the more southern states and, second, that the great majority of homes, being valued at less than \$10,000, could not afford to install a cooling device costing more than \$500 in first cost or having an operating and maintenance cost of more than \$100 per year. It is evident, therefore, that where possible the existing heating system should be used, with as little change as possible, for comfort cooling.

The existing ducts of a warm air heating system offer excellent possibilities for a combination heating and cooling plant.

The Psychrometric Chart

In order to get a satisfactory idea of the problem of comfort cooling,

The author of this series of articles is Professor of Refrigeration in the Department of Mechanical Engineering, University of Illinois. Professor Macintire is also a member or director in numerous associations allied with the refrigeration and mechanical engineering field. He is the author of a handbook on mechanical refrigeration

it is advisable to understand the use of the psychrometric chart, Fig. 1. This chart is laid out with lines of constant moisture content per pound of bone dry air indicated by the horizontal lines, and constant dry bulb temperatures shown by vertical lines, while lines parallel to *AB* indicate constant wet bulb temperatures.

If air is passed through a washer it will be cooled along such a constant wet bulb temperature line, and the amount of drop of temperature is called the wet bulb depression.

The fact that an air washer, using

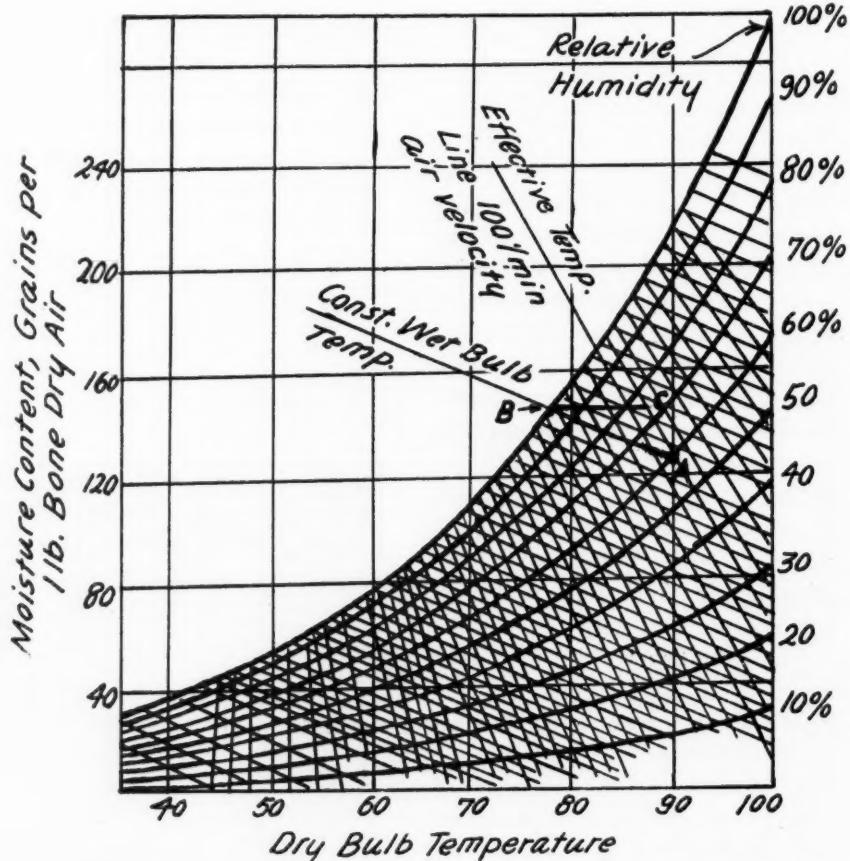


Fig. 1—There are many forms of psychrometric charts, some simple and others quite complicated. This shows a simple form on which Dry Bulb Temperature and relative humidity are plotted to give Constant Wet Bulb Temperature and Effective Temperature.

water at approximately the temperature of the wet bulb, will lower the air temperature may be used as a means of providing comfort cooling.

For example, let us assume certain conditions and plot the effect on the comfort chart shown. Let us assume that the air temperature inside the house is 90 degrees F. dry bulb and that there is 60 per cent relative humidity. If this air is passed through an air washer the air will be approximately saturated by the washer. By finding the point where 90 degrees dry bulb and 60 per cent relative humidity meet on the chart we project out on the upward slanting line to the left until we meet the 100 per cent humidity line and find a point above the 78 degree dry bulb. This 78 degrees is, of course, the wet bulb temperature for 90 degrees dry bulb and 60 per cent relative humidity.

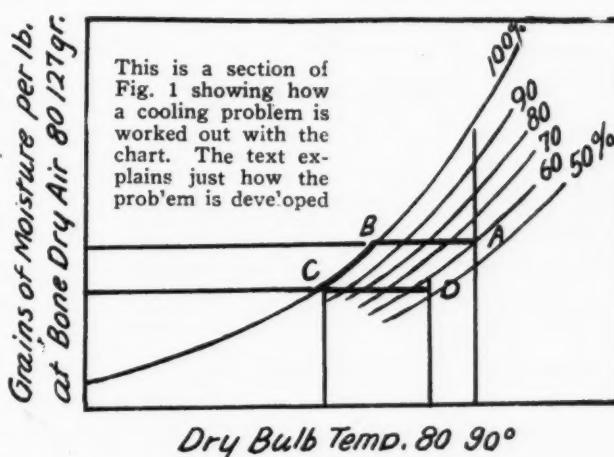
In other words, there will be a drop in temperature according to the dry bulb thermometer of approximately 12 degrees. However, the total amount of heat in the air will be the same. This 78 degree air, 100 per cent saturated, when passed into the house has the ability to absorb heat at the rate of 0.24 B.t.u. per pound of air per degree rise of temperature. When this absorbing process is going on the temperature will rise from 78 degrees, 100 per cent relative humidity to some higher temperature with less percentage of relative humidity.

If we say that the air temperature will rise 10 degrees, to 88 degrees we can find this point on our chart as shown by point C. If we compare points A and C we find that while the temperature has dropped from 90 degrees to 88 degrees the percentage of relative humidity has increased from 60 per cent to 72 per cent. It is questionable, then, whether any cooling should be tried with these conditions.

Just how to designate the com-

fort afforded occupants under these two conditions is plotted on the chart along the *Effective Temperature* lines which are the lines sloping steeply upward to the left. It will be noted that both points A and C fall on practically the same effective temperature line and that we have, therefore, gone to all this trouble for nothing.

When using *refrigeration* the problem is different, as the water used in the washer is below the wet bulb temperature of the atmospheric air. The fan recirculates the



greater part of the air and sufficient fresh air is admitted as is required by the conditions in the installation. The process of cooling the fresh air is shown by the broken line A-B-C-D in Fig. 2. The dew point temperature of the air in the house is shown by point C, which is determined by the living conditions desired in the house. For example point D represents the desired average living condition in the house, and C is the corresponding dew point temperature. The line C-D represents the process of absorption of heat due to heat leakage, solar radiation, etc., by the conditioned air from the air washer, and this absorption is indicated by the rise of the dry bulb temperature. The recirculated air enters the washer at the condition D and is cooled in the washer along the line D-C to the dew point temperature C.

As comfort and relative humidity are so closely related it is evident that *lowering the moisture content*

of the air *without change of the air temperature* may be a means of providing a more comfortable air condition.

Heat to Be Removed

The amount of heat to be accounted for by the refrigerating machine is mainly that due to *solar heat* and it may be as much as *ten times that due to heat leakage*. Tests have indicated that at times as much as 75 per cent of the total cooling required is accounted

for by the sunshine through the window glass actually exposed to the direct rays of the sun. Because of the angle of the rays, the solar effect through the east and west windows is *greater* than for the south windows. The use of awnings to protect the glass, the amount of shade from overhanging ledges, the shade from trees and neighboring buildings all affect very decidedly the amount of refrigeration actually required to provide comfortable living conditions in the summer. The effect of heat leakage through the walls in *well constructed houses* in the northern states is of little importance compared to that coming through the windows.

The heat given off by people is always a factor, but is of little importance in a residence. Likewise, the heating effect of lights, which is practically the heat equivalent of the entire watts consumed, may not be an appreciable factor. To the total amount of heat entering the building from every source must be added the amount estimated to be due to the latent heat of liquefaction of the water vapor which must be condensed, especially in the case of the fresh air coming into the house. This fresh air consists of the amount of air entering through the fresh air duct, plus air infiltration, plus the amount entering through doors while they are opened during the day.

The Effect of Declining Sales Volume On Profits

This article is, we feel, one of the most educational articles we have published this year. The figures present the stirring story of a fight to maintain profits in the face of falling sales costs. We invite comments or questions—The Editors.

WHEN we discuss business these days we are prone to admit that the depression has hit us; that sales are below normal and profits are disappearing. The matter usually stops there, and we are in the dark as to just what these conditions mean to us.

Through the courtesy of a live-wire Sheet Metal shop-owner, we have his operating figures for the past three years, with his permission to publish them. This shop is in a small city, and is fairly representative of the thousands of small shops throughout the country.

These three years are shown in complete detail, with percentages for each year and each item. Sales are, of course, shown as 100.00 per cent for each year. Careful study of these figures will prove quite interesting and instructive. Let's analyze them, using 1929 as a normal year for this shop.

Sales

We find a decreasing sales total—which, I believe, is quite representative for these times. Possibly the decrease is greater than in the average shop. (Table I)

This great decrease in sales vol-

By
Joseph G. Dingle

ume is due, largely, to present conditions. Some call it a "depression." Others say it is a Buyer's Strike. Either means *paralyzed dollars*.

Prime Costs

Material Used and Direct Labor are directly related to Sales Dollars, and for the shop man who watches his costs and uses good care in pricing his sales, the Prime Cost percentages will remain fairly normal in relation to Sales volume. We here show in percentages, the Material and Direct Labor Costs for the three years.

Year	Material Per Cent	Labor Per Cent	Total Per Cent
1929..	28.48	25.86	54.34
1930..	37.25	23.49	69.74
1931..	35.47	20.88	56.35

These figures show very nicely

the aim of the shop owner to obtain a gross profit—to cover Overhead and Profit—of 38 per cent. He advises that he obtains his Selling Price by using 62 per cent as his Prime Cost. He has obtained a better percentage in each of these years, which shows, among other things, ample allowance in his estimates for material and direct labor. Had he failed to include sufficient materials and labor in his estimates, his prime cost percentage figures would have been above 62 per cent rather than below that figure.

Overhead

This cost element, unfortunately, is not directly related to sales volume. It is the most dangerous content in the Sales Dollar and eats up more profits than any other one thing. Let's give careful thought the Overhead figures as totalled by years. (Table II)

[TABLE II]

Year	Amount	Dollar Decrease	Percentages	
			To Sales	Increase
1929	\$4,947.36	Normal	23.12	Normal
1930	4,700.60	\$246.76	30.37	7.25
1931	4,210.93	736.43	45.65	22.53

[TABLE I]

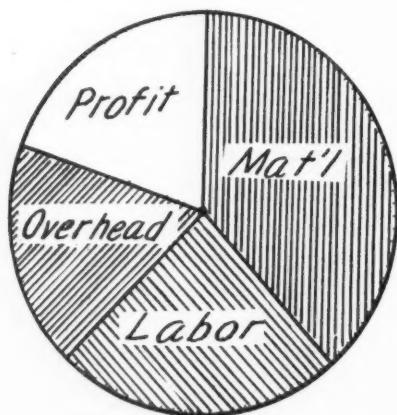
Year	Sales	Decrease	Percentage of Decrease
1929	\$21,399.44	Normal
1930	15,477.70	\$ 5,921.74	27.67
1931	9,225.06	12,174.38	56.89

These figures show a dollar and cent decrease in Overhead for 1930 and 1931. Yet, these decreased Overhead costs actually increased in their relation to the year's sales volume. This increase amounted to

A Three Year Study of Operating Figures for a Sheet Metal Shop

	1931	Percent	1930	Percent	1929	Percent	Percent
Sales	\$9,225.06	100.00	\$15,477.70	100.00	\$21,399.44	100.00	
Materials Used	2,627.29	28.48	\$5,765.67	37.25	\$7,591.27	35.47	
Direct Labor	2,385.56	25.86	3,636.76	23.49	4,468.82	20.88	
Total Prime Cost.....	\$5,012.85	54.34	\$ 9,402.43	60.74	\$12,060.09	56.35	
Gross Profit	\$4,212.21	45.66	\$ 6,075.27	39.26	\$ 9,339.35	43.65	
Expenses							
Rent	\$ 300.00	3.25	\$ 360.00	2.33	\$ 311.25	1.45	
Salary—Proprietor	1,600.00	17.34	1,200.00	7.75	1,200.00	5.61	
Salary—Bookkeeper	589.07	6.39	818.00	5.28	786.00	3.67	
Telephone and Telegraph	68.80	.75	75.08	.49	80.20	.37	
Light, Heat, Power and Water	61.84	.67	100.53	.65	132.65	.62	
Printing, Stationery and Postage	48.71	.53	80.36	.52	120.00	.56	
Dues and Subscriptions	58.00	.63	66.00	.43	73.25	.34	
Office Expense	22.51	.25	17.50	.11	30.46	.15	
Traveling Expense	50.00	.54	50.00	.23	
Advertising	343.05	3.72	560.70	3.62	262.47	1.23	
Bad Debts	68.35	.74	110.23	.71	75.95	.35	
Donations	42.50	.46	37.50	.24	43.97	.21	
Non-Productive Labor	284.00	3.08	426.30	2.75	679.20	3.17	
Depreciation	116.30	1.26	125.04	.81	137.93	.64	
Insurance—Fire	19.66	.21	23.13	.15	23.13	.11	
Insurance—Compensation	113.68	1.23	179.50	1.16	154.73	.72	
Insurance—Liability	44.40	.48	44.40	.29	44.40	.21	
Interest Paid	12.40	.13	31.83	.21	18.00	.09	
Truck Expense	249.83	2.71	320.95	2.07	333.33	1.56	
Taxes	26.01	.28	24.85	.16	21.45	.10	
Sundry Shop Expense	91.82	1.00	98.70	.64	368.99	1.73	
Total Expenses	\$4,210.93	45.65	\$ 4,700.60	30.37	\$ 4,947.36	23.12	
Profit	\$ 1.28	0.1	\$ 1,374.67	8.89	\$ 4,391.99	20.53	

The Dollar He Wanted



This is the breakdown in the income dollar which the owner of this shop aimed to maintain

7.25 per cent in 1930, and 22.53 per cent in 1931. In other words, with an actual reduction of \$246.76 in overhead costs for 1930, as compared with 1929, Overhead consumed 30.37 per cent of the Sales Dollar in 1930 as compared with 23.12 per cent in 1929. That's bad enough, but look at 1931. Overhead costs were \$736.43 less than in 1929, but—due to the small sales volume in 1931—consumed 45.65 per cent of the Sales Dollar, and, as a result, ate up all of the profits EXCEPT \$1.28. We repeat that Overhead eats more profits than any other element of the sales dollar.

Detailed Overhead Costs

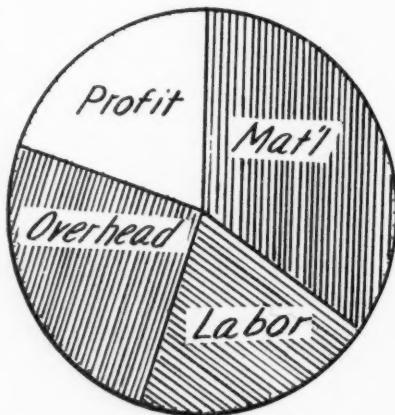
Having shown, under Overhead, the conditions existing in 1930 and 1931, in the relation of Overhead to Profit, we now will look at the detailed expenses and endeavor to find where we can cut expenses to save ourselves from a greater loss in 1932. The detailed figures here used are taken from the Comparative Statement here illustrated.

Rent is our first expense. We find that this was \$311.25 for 1929, \$360.00 for 1930, and \$300.00 for 1931. Yet, when reduced to a percentage of sales, we find it increased each year. In 1929, with sales of \$21,399.44, rent consumed \$1.45 out of every \$100.00 we received from our customers. In 1930, rent consumed \$2.33 out of every \$100.00

and in 1931, we find rent consuming \$3.25 out of each \$100.00.

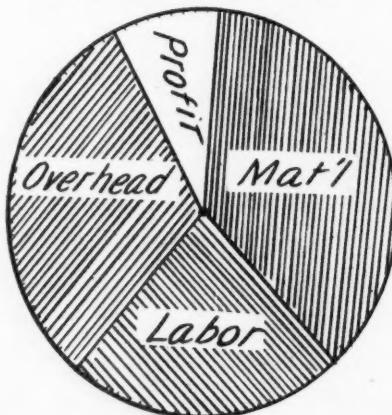
Now, it is quite important that you get this idea firmly fixed in your mind. Rent, like taxes, is common to all business, and here we find a good illustration of the effect of sales volume on overhead. We paid \$11.25 less rent in 1931 than in 1929, yet on account of a

The 1929 Dollar



In 1929, Overhead increased but Profits were maintained by reducing Material and Direct Labor cost. This is a picture of the breakdown

The 1930 Dollar



In 1930, Overhead, Material and Labor all increased resulting in a drastic reduction in Profit—9 cents instead of 20 cents

decrease in volume of sales, rent has consumed \$1.80 of our anticipated profit in every \$100.00 of sales. In other words, we have our rent increasing by more than 125 per cent in its relation to our sales volume when, as a matter of fact, we paid less rent than in 1929.

The other expense accounts are subject to the same comments as rent. Follow them through and

you will be sure to find that extreme conditions exist in almost every case. Take, for instance, Insurance—Liability. This expense was the same amount each year—\$44.40. Yet, when applied against sales volume, it shows a material increase each year. It was 21 cents in 1929, 29 cents in 1930 and 48 cents in 1931. It ate up 27 cents of profit in every \$100.00 of sales in 1931. Truck expense, with a declining cost each year, consumed a greater percentage of sales dollars—\$1.56, \$2.07 and \$2.71.

Advertising shows as follows:

Year	Cost	Percentage
1929	\$262.47	1.23
1930	560.70	3.62
1931	343.05	3.72

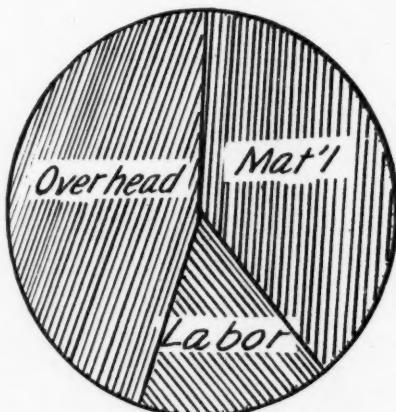
We spent, in 1931, \$217.65 less money for advertising than in 1930, yet it was 10 cents more in the \$100.00 for 1931 than in 1930.

In order to show more forcibly the effect of the declining sales volume for the three years covered by the above detailed figures, we here show graphs illustrating: Fig 1—the DOLLAR HE WANTED and the DOLLARS HE RECEIVED.

Fig. 2—Our Shop-Owner wanted a Sales Dollar which covered his costs and left 20 cents profit. His 1929 Sales Dollar gave him the 20 cents, but his overhead was more than he expected. To offset the increase in overhead, he had a lesser material and direct labor cost.

(Continued on page 39)

The 1931 Dollar



In 1931, Profit disappeared because Overhead increased tremendously due to reduced sales. This was an unsatisfactory showing

Pattern for a Revolving Chimney Cap

By L. F. HYATT

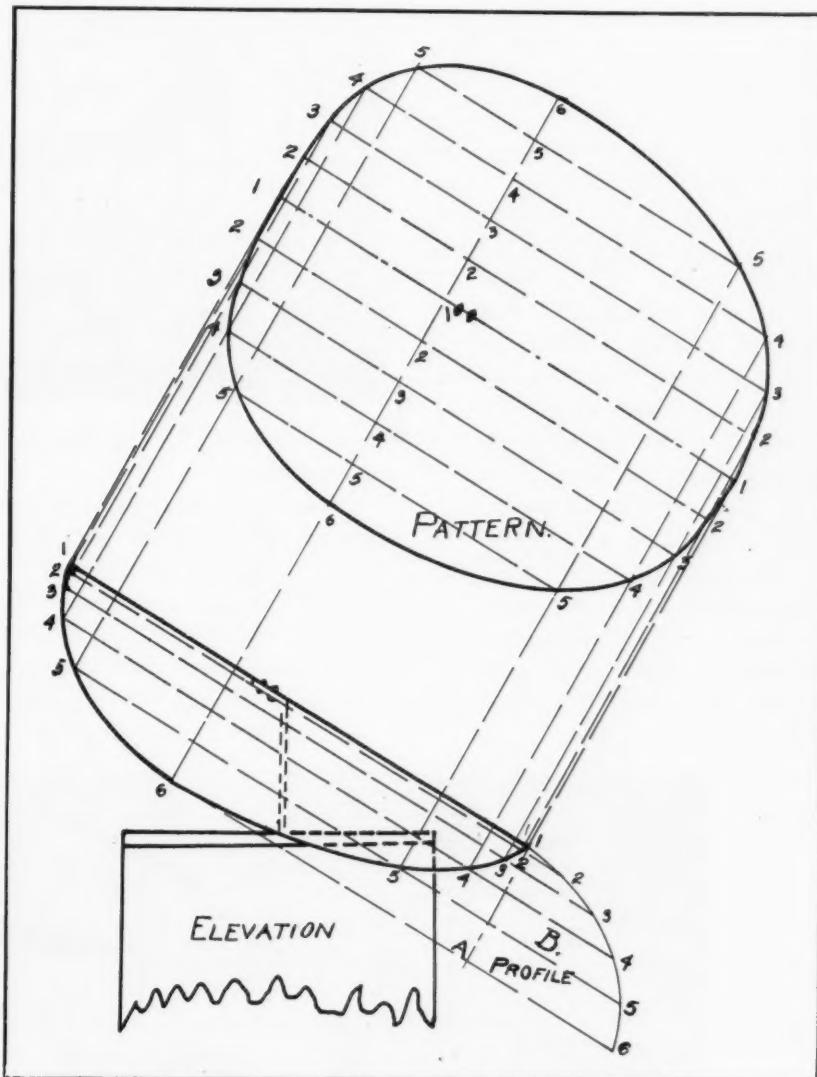
Contributing Editor

THE method of developing a pattern for a revolving chimney cap was a request from an ARTISAN reader of Dade City, Florida. There are several designs in common use but the method of developing the pattern is practically the same. There are several excellent castings made on which the cap pivots which may be purchased from the manufacturers.

First draw the elevation view as shown. Then draw the profile, View B. Make the distance A-6 wider than half the diameter of the pipe. Divide the curved line into spaces, in this case 5, and number each point as shown. Now draw lines from each of these points so as to intersect the curved line in the elevation view locating similarly numbered points on each end. Draw a line at right angles to the slope of the cap from point 6 on the elevation. At right angles to this line draw the center line 1-1 as shown. With the distances 1-2, 2-3, etc., found on the profile step off like distances each side of the center line on the stretchout line and number them as shown. Through each of these points draw lines of indefinite length parallel with the slope of the cap. Next draw lines from each of the numbered points on the elevation and then draw lines parallel

with the stretchout lines, intersecting like numbered lines on the pattern. After these points are num-

bered the curved line describing the outline of the pattern is drawn as shown.



Effect of Declining Sales

(Continued from page 38)

Fig. 3—The 1930 Sales Dollar contained 60 cents worth of Material and direct labor, and 31 cents of overhead, leaving only 9 cents profit instead of 20 cents. Overhead ate up 11 cents of the profit.

Fig. 4—The 1931 Sales Dollar is a most unsatisfactory one. While material and labor accounted for 55 cents of the dollar, Overhead

consumed 45 cents leaving no profit.

These figures and charts serve to show very clearly the effect of declining sales volume on profits. Each year shows less sales and less overhead also *less profit*. Overhead can rarely be decreased sufficiently to save profits when sales volume shows such declines as our figures disclose for 1931. Yet when the shop owner knows just what his problem is, he can better steer away from the rocks of disaster.

One Thermostat Control

(Continued from page 33)

in cold weather that the acme of humidification is required. A direct load is thrown on the heater by the use of outside air, but the item can be overlooked when the benefits are considered.

The double mixing type of temperature control damper lends itself admirably to the constant service of the fan.

The Professional Building—A 12 Story Air Conditioned Structure

HERE has just been completed in Phoenix, Arizona, an office building which embodies many radical departures from standardized building design and emphasizes strikingly those developments which may soon become ordinary practice.

This structure, the Professional Building, was designed by Messrs. Morgan, Walls and Clements of Los Angeles with H. H. Green of Phoenix associate architect.

Most unusual, of course, is the fact that the entire twelve story building is air conditioned in the highest sense of the term.

There is not one, but seven, separate air-conditioning systems in the building, all installed by the Southwestern Mfg. & Supply Co. of Phoenix. This firm also handled the exterior sheet metal contract, an interesting detail of which is the



copper "plating" of all limestone window sills.

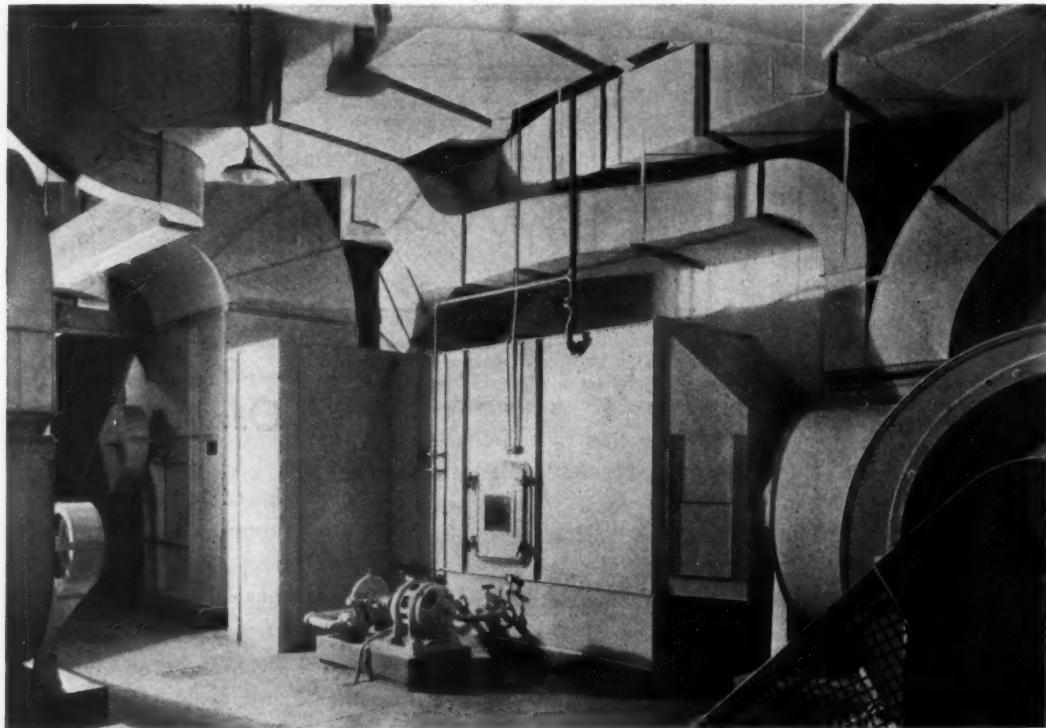
Unusual as it may seem to persons not yet convinced of the widespread interest in conditioned air, the fact is that air conditioning was the first subject the building owners discussed with their architects. As a matter of fact, before the own-

ers took up such matters as whether exterior walls were to be of brick, reinforced concrete, stone or terra cotta they demanded, primarily, a thoroughly efficient, 100% job of air conditioning. For the hard-headed bankers who control this building know that prospective rental income from tomorrow's office building will bear a direct relation to the efficiency of its air conditioning system.

They imposed no price restriction on this all-important item.

In consequence, they got a good job.

A job which is believed by the contractors to be unique in many respects. Vitiated air is removed by a separate return fan and mixed with entering fresh air by means of automatic dampers. A portion of this vitiated air is exhausted, of course, but over 80% is forced



Photos by Mott Studios, Los Angeles.

The basement machine room shows the excellence of the metal fabrication and the intricate layout required to meet building conditions. The photograph shows several fans and one washer-cooler

through dehumidifiers, where its excess moisture is extracted before the treated air is again forced back through the system.

Air in the first two floors (occupied by the Valley Bank, with its lofty ceiling and mezzanine) is conditioned by special equipment located in the basement of the building.

This was a straight-forward part of the whole job for which detailed plans could be—and were—prepared in advance.

Individual Systems

But from the third floor upward no floor plan was exactly typical. No individual office air conditioning installation was exactly like any other system.

This was because all office space was designed for doctors, dentists, and other professional men and women, and it was recognized that X-ray operation in some offices; chemical laboratory work in others, etc., would impose varied demands on the air conditioning system. Not only that, but the business agents for the building advertised that, as a special inducement each prospective tenant would be permitted to have his office partitioned, and his mechanical equipment placed to suit his own individual requirements, and the office would subsequently be finished to suit his fancy.

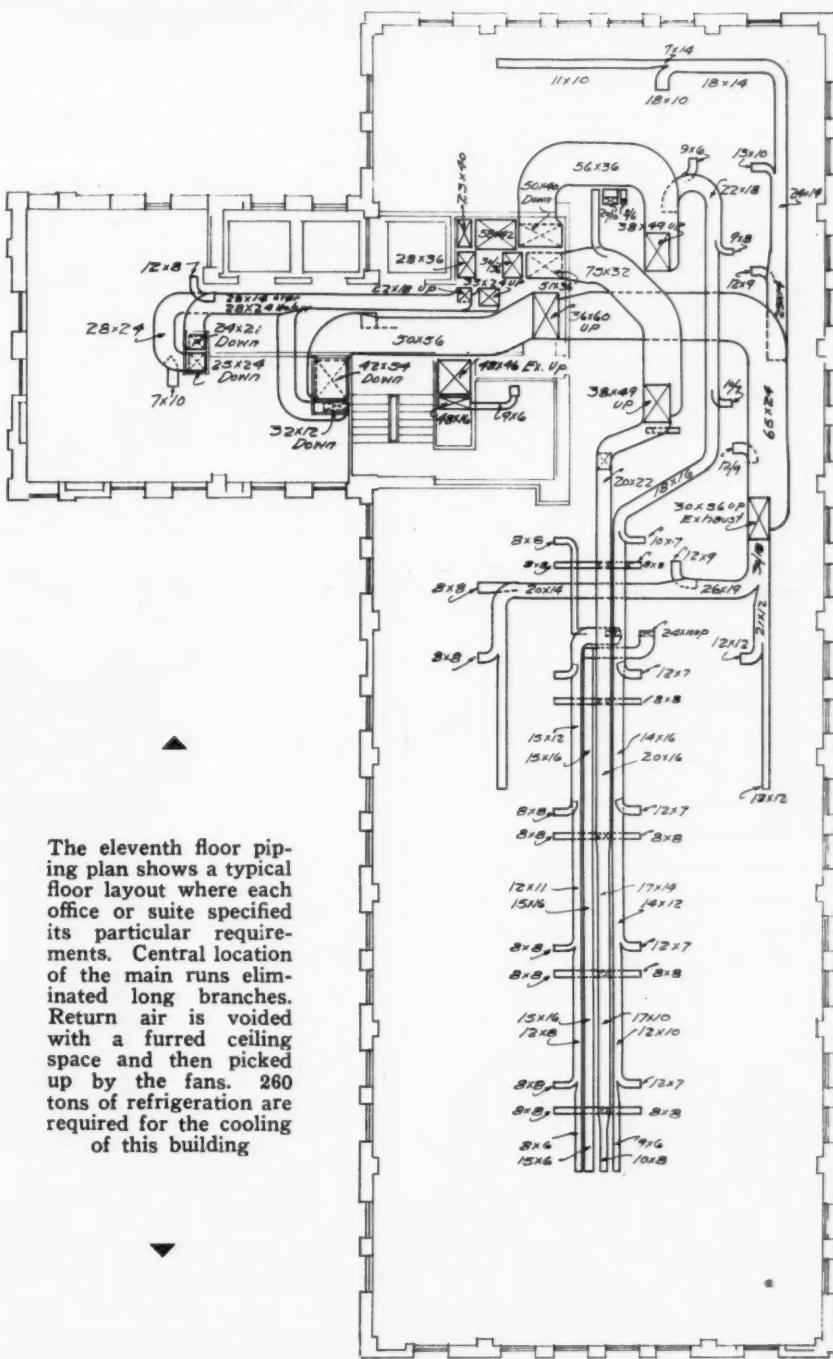
So, as the business agents closed leases from day to day the new tenant made his peculiar wants known to the architects and a plan for that office would be released.

Imagine the problem of the air conditioning engineer!

Zone Conditioning

All window sash are fitted with ventian blinds. That helped. The building was zoned by the engineers in accordance with heat losses and exposure. For example: the *west* exposure, which bears the brunt of the hot setting sun, was equipped with continuous runs, the length of the building—no taps being taken off. These supply runs, together with the east runs, were

The eleventh floor piping plan shows a typical floor layout where each office or suite specified its particular requirements. Central location of the main runs eliminated long branches. Return air is voided with a furred ceiling space and then picked up by the fans. 260 tons of refrigeration are required for the cooling of this building.



11th FLOOR PLAN

tapped back to the fans on the roof (12th story). The supply for the inside rooms or those on the court, were, of course, of lighter capacity.

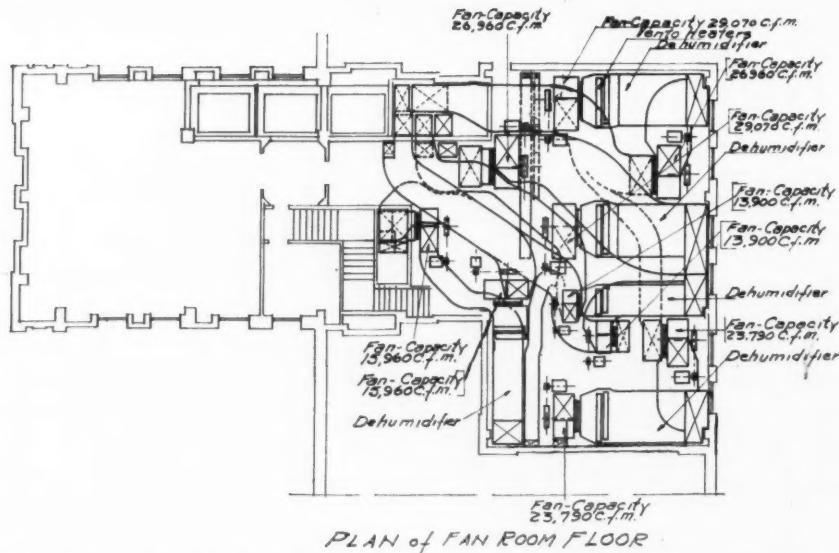
In most cases air is introduced into the rooms through special diffuser-type registers. The air in the room is returned through another identical grille, into a plenum space formed by the furred ceiling from which space the air is picked up through openings in the return ducts.

In certain other parts of the

building, however, used air is voided through louvres above the office doors, thence into the general corridor space where it is returned through ornamental grilles into the return ducts.

All toilet rooms in this modern building are between floors. These toilet rooms have their own exhaust system, handled by a separate fan which is located at the highest level of the building—atop the penthouse.

The refrigeration plant, with a



The plan of the 12th floor fan room shows a complication of piping to tax any ventilation contractor's ingenuity. Seventeen fans are placed in this room

capacity of 260 tons per day, is situated in the basement, and refrigerated water is boosted from the basement to the dehumidifiers on the roof of the building. In this roof room, 47 by 35 feet, is a maze of duct work whose fabrication and erection pays high compliment to the skill of the lay out man and the craftsmanship of the erection crews. All told, in this comparatively tiny space there are seventeen fans (Siroco) Number 3 to Number 9. Here too, there are five dehumidifiers ranging in gallonage from 45 to 340 gallons per minute. In front of the dehumidifiers for the "inside" runs and for the banking space, are the vento stacks.

Instead of the unsightly cooling

This is a picture of one corner of the fan room and shows typical duct construction and fan housing

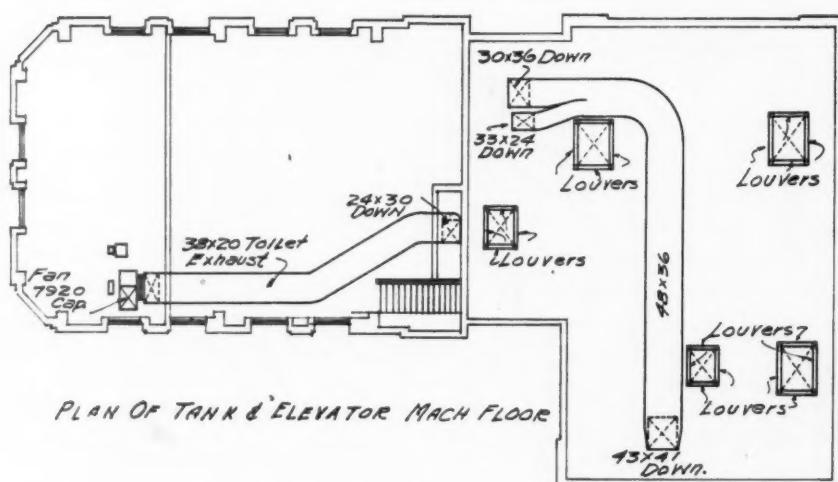
Photo by Mott Studios, Los Angeles



tower this job is equipped with its own supply and return wells, handling 1,100 gallons per minute.

their "ultra-modern air conditioning system"; it is actually their main talking-point. And the conviction that the "Professional Building's cooling plant is really perfect" has drained many tenants from other less modernly equipped buildings. Right now other building owners are rushing to install somewhat similar systems, or are planning to do so in the very near future. Meanwhile, as a result of all this activity the Phoenix Chamber of Commerce makes this proud boast: "More air-conditioning tonnage, per capita, than any city of the nation!"

This installation emphasizes a development—office building air conditioning—which undoubtedly will result in much work for sheet metal contractors.



Other fans are located on the roof where gravity vents for toilets are brought up from the top floors

Residence Ventilation



Two typical houses with attic space ventilation. Note the inconspicuousness of the ventilator heads

BIRMINGHAM, ALABAMA, and vicinity to most northerners means an area where summer brings really hot weather. What people don't realize is that the area lies on the foothills and is, therefore, comparable to a more northerly climate.

Nevertheless, people who live in this area are accustomed to a long summer period during which hot weather is much in evidence.

In this area summer begins about May 1 and lasts until October 10. Between nine o'clock in the morning and five in the afternoon 90 degrees or better is customary. Rains during this summer period are short and heavy resulting in humid conditions lasting a few hours.

Most of the houses in this territory are frame construction, with little weatherstripping and almost no insulation, even in attic spaces.

Under these conditions gravity ventilation has come to play a role of importance in home comfort and in the operations of the sheet metal contractors. In some towns one house out of five has its gravity



in the
Birmingham Area

This article describing residential ventilation in the southeast was prepared from information and illustrations supplied by S. A. Sale, representative of the Allen Corporation, Detroit, manufacturer of the Allen Turbine ventilator. The photographs show Allen ventilators on the houses.

ventilator and the adoption of this unit is growing steadily.

Typical Applications

Practically all these installations are what we term attic space ventilation. A typical bungalow will have one grille with a valve cut through the ceiling of each room and opening into the attic. A ventilator is cut through the roof to exhaust hot air.

People around Birmingham are very particular of appearance. They do not like a large ventilator sticking up along the ridge or placed on

the front slope. So most of these installations are made in the back slope of the roof with only the head of the ventilator sticking above the ridge.

By using two or three small ventilators these heads are inconspicuous, yet efficient. From the street most of these heads show only the top portion and where there is any foliage may be entirely hidden.

Installations of ventilators are by no means confined to small one-story homes. Owners of the smallest bungalow have proved just as anxious for comfort as the owner of the most pretentious residence. Because of this fact, it is quite customary to have ventilation considered very seriously in the remodeling and rebuilding of existing houses of the larger types or the designing of new houses.

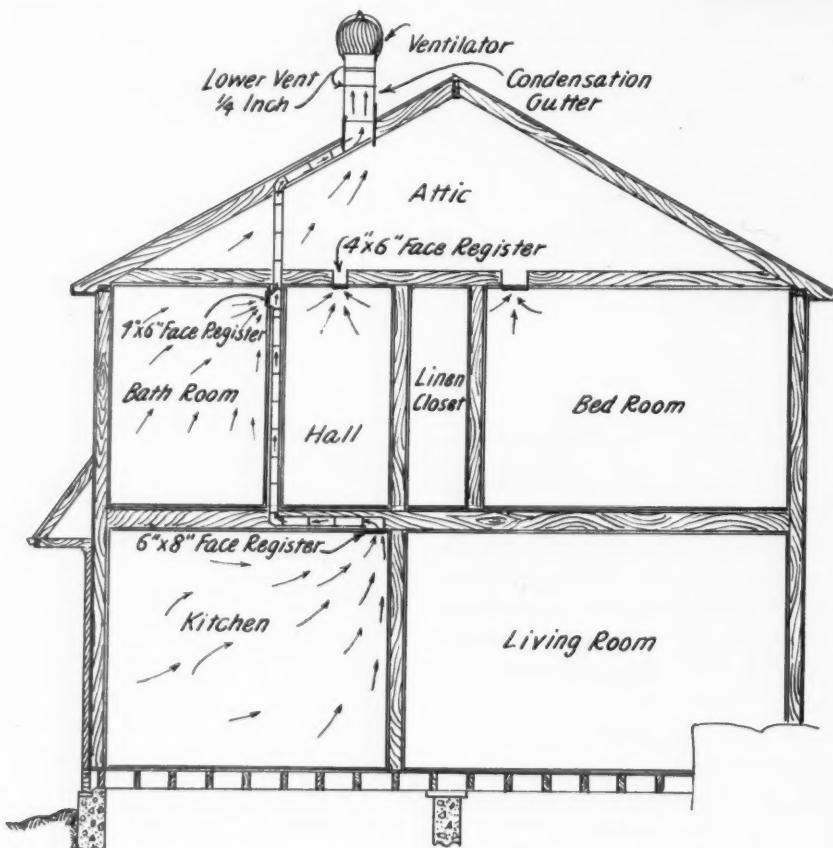
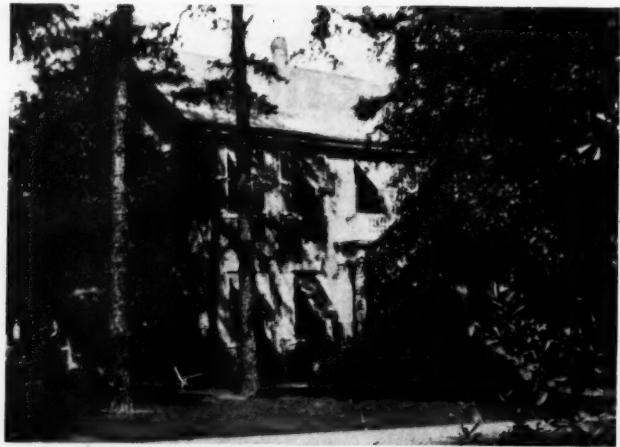
For the two-story house the ventilation system for the second floor and the attic is designed similarly to the system used for a one-story house. Rooms on the first floor, which the owner desires vented, are connected to the attic space through individual run stacks, just like the

stacks we use for heating. These stacks either empty into the attic space or are directly connected to the base of one of the ventilators.

One interesting practice which is universally followed is the practice of shutting all windows, pulling all blinds, and lowering all awnings along the sunny side of the house. Windows and doors on the shady side are thrown wide to let in air and breeze.

At the same time ventilators are placed on the hot side of the roof

This large home to the right uses two ventilators. From the street these heads are barely visible. The owner reports excellent results in the removal of hot ceiling air



if possible so that the ventilator is working in the hottest air; namely, that heated by solar radiation as well as pushed up from the rooms below.

Another feature which these southern contractors have developed is the use of outside eave vents around the attic space. These vents are usually long and narrow grilles cut through the eave line and faced with bronze wire or a stamped face. The inner face is above the attic floor line. These grilles are used when attic ventilation alone is the method used. When rooms below the attic are vented these grilles cannot be used.

Above is a typical ventilation system. Ceiling grilles are used for the second floor rooms and stacks for the first floor rooms. Different variations of this system are used

To the right is the rear roof slope of a small one-story house with three ventilator heads. From the front these heads are barely visible



The way ventilator sales were started in the south followed much the same procedure others are using. In most of these communities, one home owner willing to try a new idea installed a ventilator. He found its benefits very real and actual and told his friends all about it. Word of mouth advertising started the movement on its way.

Profit Possibilities

Contractors report that a sale for a one-story house will run about \$50.00. For large houses of the two-story type an installation may run as high as \$150.00. A good average will be \$70.00 per installation.

Most of the ventilators sold are manufactured, for contractors have found that it does not pay to guess at the capacity and efficiency of home-made ventilator which may be installed to move 20,000 cubic feet of air per hour and actually only deliver 15,000 or even less.

In design, these southern systems follow much the same engineering principles all contractors have proved feasible. For example, air



This modern type story and one-half house has one ventilator placed above the center point of the attic. The head might have been set even lower

changes are figured as one change every four or five minutes or between 10 to 15 changes per hour. Ventilator sizes are figured large enough to give this number of changes. Also grille faces are calculated large enough to pass the cubic contents of each room into the attic every four or five minutes.

Air Changes Per Hour

Air changes per hour, rather than air volume according to the number of occupants, has been established because most of this ventilation is for sleeping quarters where but one or two persons occupy a room. It has been established that the cost difference between providing just enough air per occupancy and providing large quantity circulation is comparatively slight and that the latter principle results in a much more satisfactory installation. Also, in sleeping room ventilation the occupant is relaxed and able to give thought to even slight imperfections in a ventilation system, therefore, more air than may be necessary is advantageous and certainly not harmful.

In locating grilles most of the contractors place the grille in the ceiling and locate it as close under the ventilator as possible. Where

▲

This installation has one head for a two-family house. The attic also has eave grilles to let outside air into the attic



two or more ventilators are used, the grilles are divided up so that each ventilator has a nearly equal number of faces under it.

In some instances grilles are located in side walls, usually as close

up to the ceiling as possible and connected by a short riser to another face in the attic floor or simply opened into the attic space.

In practically all installations the valve is left in the face so that the grille can be closed during the heating season. In all gas heated houses this valve is arranged for easy operation so that collection of moisture laden air from the heaters can be immediately exhausted and the grille regulated.

Another interesting practice has to do with the painting of the ventilators above the roof. Various colors have been tried out resulting in a practice of painting the ventilator the same color as the roof or some bronze or aluminum color for camouflage against the sky and clouds.

This field of ventilator sales has been developed into a very profitable business by these southern contractors. Tangible results, both as to profit and repeat business, have been proved.



Multiple-family apartment buildings are made more attractive to tenants by insuring a cooled second floor. Air change and not refrigeration does the trick

Small Shop or Big Shop— WHICH SHALL I BE?

By B. L. SCHWARTZ

Address at National Warm Air Heating Ass'n Meeting

DEALERS today can be classified into two groups:

- (a) The large scale operator employing from 10 to 100 or more men.
- (b) The individual dealer, wherein practically all customer contact is made by the dealer and who personally directs the shop activities.

Suggestions for greater business activities of large scale operators follow established methods of procedure; and are available from a number of authentic sources. This discussion will cover primarily, the field of small dealer activities; as these are, at least numerically, in the great majority.

The small dealer must, of necessity, depend largely on his own efforts. He need not be a mechanic; in fact, it is better if he is not a mechanic. His field lies in customer contact; and he must be a good salesman and businessman.

Dealer Limitations

To secure best results, the present-day, small dealer must limit his activities and organization in such manner that he can personally supervise or keep in direct contact with all phases of his business. As soon as he grows beyond the point where he can personally keep in touch with every phase of his business, it becomes necessary for him to depend upon others to carry on the main functions of the business operation. At this point the dealer loses the personal contact which is so essential for successful small dealer activity; and therein is determined the point at which he must



decide whether to expand further or continue with his present plan.

The man whom we are talking about should, when this point is reached, put himself in the position of a looker-on, an outsider, a man sent to analyze someone else's business activities; and then decide whether he is best fitted to carry on a large business or whether he is so limited as to lose by such expansion. In other words, each individual dealer must analyze his ability and limitations in order to determine for himself whether his interests will be better suited to limit himself to a small organization in which he can personally supervise all operations; or whether he has the vision, the desire and the ability to direct a large organization. Unless he is able to honestly convince himself that he has the ability to carry out such activity, which includes in its scope a definite and positive setup for financial expansion, the present-day small dealer had best limit himself to such efforts as he can personally supervise.

It is necessary that we take physi-

cal inventory of our capabilities and limitations. Without such frank inward analysis and truthful confessions of our limitations, we are apt to over-step the bounds of good judgment and thus lose all that we might have gained by staying within our limits.

Small Dealer a Specialist

The heating contractor of today must be a heating specialist. He must know his B.T.U.'s; and be able to intelligently present his story. He must be able to correctly size up the customer's needs and then make proper recommendations to fill them. He should be able to lay out a heating system and have logical reasons for every step of the way. It is not sufficient for a heating contractor to "guess" that a certain size furnace and a few pipes will do the job. He must know.

What differentiates between a capable heating engineer and the ordinary salesman or mechanic who graduated from the ranks?

First of all, the engineer knows the whys and wherefores for the statements he makes. With this knowledge and assurance, he can speak confidently and intelligently to his customer. Such a presentation creates confidence in the customer; and the usual reaction is a preference for his recommendations.

On the other hand, the man who doesn't thoroughly understand his subject is not going to be able to present a convincing story. Faith in his knowledge and ability is shaken; both in himself and his prospect. The net result is a discouraging reaction on the part of his prospective customer.

I am not inferring that the salesman or mechanic who started at the bottom is not capable of being successful. It is necessary, however, that he does not stop there. The successful dealer today must know his subject and keep abreast of all new developments in his line. He must constantly strive to learn more about his subject. He should consistently read the trade papers and magazines. He should take part in his local organization activities; and in every way seek to improve his education along his chosen line.

I cannot stress too highly the advisability of subscribing to, and reading, the trade papers covering your chosen line of activity. There are several worthy magazines on the market today. Every man in the warm air heating business should be a consistent reader of these trade papers. You will find therein many worthy suggestions and articles on every phase of the business which you have chosen. If you are "eye-minded," these papers will be particularly valuable to you. There are also other worthy magazines of a more technical nature on the market; but I feel sure that if the average dealer will at least read the articles in some, if not all, of the magazines we have outlined, he will learn rapidly.

Association Advantages

To those of us who are more "ear-minded" than "eye-minded" we recommend that you join your local contractors' associations and attend as many of the national conventions as you can. It is most interesting and educational to come in contact with your fellow competitors and learn from them some of their experiences. You will find that such contact is pleasant; and that the average competitor is a mighty fine fellow personally. If you attend the conventions, you will hear papers read and topics discussed of heating practice in various parts of the country that will give you a different point of view in many cases. The man who desires to keep abreast of the times and avail himself of every opportunity, to be awake to the best possibilities for successful business activity, should take advantage of these opportunities.

It is important to know something about other allied lines. The warm air heating engineer should know the fundamentals of hot water and steam heating. He should be able to make an intelligent comparison of his system and that of some other type. All too often the wet heat representative will make misleading and false statements to Mr.

Prospect which must be convincingly offset by the warm air heating dealer. Knowledge of competitive limitations is essential.

In the larger organizations, the same general requirements also hold true. In such cases, the business is departmentalized and a head assigned for each department. The individual department head then compares with the small dealer; and he must be fully capable of such capacity.

Advantages for Small Dealer

If the small dealer is capable, he has decided advantages over the salesman of the large scale operator. He has the knowledge of power and assurance which an ordinary salesman (usually working on commission) lacks. Most people would rather do business with the "boss" or some one in authority. And the small dealer has the opportunity of presenting this setup.

With this thought in mind, then, the small dealer should print cards identifying himself as the general manager, proprietor or some other dignified office. This will give him an atmosphere of importance when he presents his card to Mr. Prospect for an interview; it will also give his written communications more attention.

The small dealer has the further opportunity of offering his prospect a more flexible proposition than the salesman of the large organization. In the latter case, the line is usually limited to a certain unit. The dealer on the other hand, has the choice of any or all of the various units available; and can thus truthfully recommend that which he honestly feels will best fit the customer's needs. Whether this be a small gravity plant or a complete air conditioning system; a revamp job or the addition of temperature controls, fan, etc.; he is still in the best position to make the most convincing presentation. It is essential, however, that he "knows his stuff;" and therein lies the fundamental basis of this talk.

To the dealer who knows his sub-



This is the office and shop of the Schwartz Furnace Co., Pittsburgh

ject, the field is unlimited. He is not hampered by rules and regulations laid down by "headquarters." He can use his own judgment and beliefs in making his recommendations. There is no question about the advantage the small dealer possesses in this.

To the dealer who is just breaking into the field of air conditioning and who does not have the proper background and sufficient training to make his own recommendations and layouts, we advise that you tie up with some of the larger manufacturers' organizations which maintain an engineering department service. Send your plans and specifications in to the engineering department of these manufacturers and they in turn, will prepare a layout which will undoubtedly work. The disadvantage in this procedure to date, seems to be the delay in getting sufficient information to the manufacturers' engineers to enable them to make an intelligent layout; plus the necessary time element required to have this work done and mailed back to the local dealer.

This, however, is a step in the right direction; and the dealer will find after a few cases of this sort, if he applies himself and is willing to study, that he will be able to make his own layouts without having to go to the factory for them.

Lines for the Small Dealer

What are some of the lines available to the small dealer?

(a) THE TRIED AND FOUND RELIABLE GRAVITY JOBS:

These can be divided into

1. Coal fired units.
2. Gas fired units.
3. Oil fired units.

(b) AIR CONDITIONING FOR THE BETTER CLASS OF HOMES:

This is a rapidly growing field; and if we don't awake to the opportunities available, someone else will take this lucrative business away from us.

This is a long address—much longer than we usually publish. Nevertheless, every paragraph is packed with important and pertinent information, gleaned from a wealth of personal experience. If you will take time to read this talk through we feel sure you will agree with us that Mr. Schwartz here gives us a highly practical analysis of the present situation.

There is no question but what air conditioning at the present time presents the big, outstanding opportunity for the capable dealer. At the present time, a number of manufacturers feel that they must, in effect, enter the air conditioning field direct. This is undoubtedly due to their belief that the present number of dealers who are really capable of designing and installing air conditioning plants that will be a credit to everyone, is limited. I feel sure the manufacturers would rather distribute their product through recognized, capable local dealers than assume responsibility for such installations. I also feel that it is to the interest of the small dealers to equip themselves mentally and physically to be able to do air conditioning work in a manner that is a credit to everyone concerned.

The public is not only becoming air conditioning conscious, but has been so for a year or more. This trend is clearly evident to those who will investigate.

(c) REVAMP AND MODERNIZATION WORK:

The great majority of present heating plants are sadly lacking in many outstanding essentials. The capable heating man can undoubtedly walk into 99 out of every 100 homes today and honestly and truthfully inform the owner of many worthwhile improvements available for his plant. What a field this is! It is practically unlimited during your lifetime

and mine. Filters, fans, humidifiers, etc.; all of which modernize the old heating plant.

There are a number of interesting ways of getting into the prospect's home for the purpose of interesting him in improving his heating plant. One of the best methods yet developed, is that of an inexpensive filter which has recently been put on the market. The idea of cleanliness is something which appeals instantly to every woman; and it is easy to get and hold their attention with the story of how much cleaner a heating system can be by the introduction of inexpensive filters. Once inside the door and in the basement, the task of completing the story is very much simplified.

There are other ways of getting into the basement; particularly the approach for automatic humidification, forced air heating, automatic controls, etc.

Taking these in order, you and I know the advantage of proper humidification. However, the public at large is sadly lacking in this knowledge and it requires too long a story to interest the average person on a normal canvass or approach basis. This particular source of approach then, has a definite limit.

The story of forced air heating can probably be applied more convincingly in a first approach proposition. However, it is best to consider a complete forced air heating plant, rather than a simple, inexpensive booster job; and if this be the case, the average cost figure is so much higher than the average prospect is willing to consider, as to prohibit further negotiations.

The appeal of automatic controls is big. The public today is lazy. They want automatic operation for everything.

Gravity Heating

If we analyze the main fields of endeavor for warm air heating dealers, we find that gravity heating is by far the most predominant. Hence, we must not pass up this great market for replacement work. Furnaces have a habit of wearing

out; just as do our automobiles and other mechanisms. The replacement field is large and won't be saturated for many long years to come; if at all.

The great majority of homes having a central heating plant, are in the field of gravity installations. After all is said and done, a good gravity job is so much superior to the steam and hot water plants as to throw all the balance in our favor. They have continued to serve the great American public faithfully for scores of years; and will undoubtedly continue to predominate over all other types of heating systems.

We know that air conditioning is a decided improvement over gravity heating; and this statement is made with all due respect to the merits of gravity warm air heating. The number of real air conditioning systems that will be installed in the future, however, is smaller than will be the number of gravity plants; for at least many years to come. Hence, it is essential that we keep in mind the gravity warm air heating field and not pass it up for entire devotion to air conditioning, unless the dealer so desires.

Air Conditioning

The field of air conditioning is rapidly becoming greater. Unless many present dealers equip themselves mentally and with adequate selling personnel to cover this field, I'm afraid we'll lose part of it to outside interests. Just as coal dealers are now doing furnace cleaning and repairs, just as lumber dealers have stepped out of their line to sell paints, etc., so will steam fitters, refrigeration organizations, etc., step into the air conditioning field to fight us for this work, unless we set ourselves up as experts.

There are many authentic sources of real information about air conditioning that can be secured for the dealer. Many manufacturers have set up engineering departments wherein any dealer, who has sufficient interest, is more than welcome for instruction. Some manufacturers and associations have arranged instruction classes. A number of

colleges have arranged definite courses of instruction in air conditioning design and installation. On top of this, the trade magazines in our line continually feature various phases of design and good practice in connection with air conditioning systems. Hence, there is no longer any legitimate excuse for stating that the average dealer cannot become proficient in proper air conditioning installation work.

The field which is beckoning to us for air conditioning installations is tremendous. The public is beginning to appreciate what air conditioning is and wants it. The old fashioned system of heating by radiation is passe. If the dealer will avail himself of the opportunities confronting him, there need be no question about his ultimate success.

Ask Customer to Buy

The successful dealer, however, will go out and *ask* his prospects to buy. He won't wait for them to call him; he knows that the customer must be *sold*. And therein lies one of the main differences between the successful dealer and "just another dealer." The Chinaman says "No tickee, no washee." The public says "No askee, no buyee."

How many times have you, as an individual dealer, gone out to see a prospect and have spread before him an attractive story for a heating plant or some other equally desirable piece of equipment or apparatus; and then considered whether you definitely asked him to buy or

The concluding sections of this address will be published in the July issue. In the next part, Mr. Schwartz discusses advertising, photographs, service and selling. If you have found practical information in this first part, you will be interested in what the author has to say on the above present day problems.

whether he first spoke up and said "leave your literature here and I'll think it over." It is quite evident that sometime before the prospect made this last statement, you should have definitely asked him to give you the order or authorize him to have the work done. If it is embarrassing to definitely come out flat-footed and ask this direct question, then ask him when it will be most convenient for him to have you start work; or any other similar but leading question.

The manufacturers are doing a good job of developing air conditioning equipment so that we'll have a good product to sell. In fact, some of them are overdoing it in hastily putting their product on the market without sufficient engineering foundation in back of their development. If, however, the dealer is thoroughly familiar with his subject, the good can easily be differentiated from those whose sole idea seems to be "quick sales."

If you are not sufficiently versed with this type of equipment to be able to satisfactorily differentiate between the good and the bad, ask some of your fellow competitors at the regular association meeting what type of equipment they use and why. Ask them what their experience has been in the use of this and other equipment which they have tried out. You will thus be able to secure a lot of definite information and benefit from their experience without having to go through the same experience.

The dealer who quotes on more than one type or class of unit, puts the burden of choice on his prospect instead of making a specific recommendation to him. As a result, there is no single line of thought to concentrate on; and the prospective purchaser loses confidence in the dealer's proposal.

The dealer also loses confidence in his own equipment by using too many different lines of similar apparatus. In this way he cannot be convincingly sincere in his recommendation that one particular piece of apparatus is the one best fitted for the prospect's job.

National Warm Air Heating Ass'n.

Mid-Year Meeting

THE mid-year meeting of the National Warm Air Heating Association, held May 18 and 19 in Columbus, exceeded in interest and scope of information presented many past and perhaps better attended gatherings. The registration lists showed 189 members in attendance.

Perhaps one of the most interesting features of the meeting was the unusually high class of the addresses delivered. Practically every subject was timely and well chosen and delivered by members well qualified to discuss the subject assigned. As a result, the feeling was everywhere expressed that the convention was well worth while.

President I. L. Jones could not preside because of an illness which kept him at home. His place was taken by Vice-President W. L. McGrath.

A. W. Wrieden

The convention program listed a larger than usual number of addresses, the first of which was given shortly after the meeting opened by A. W. Wrieden of Holland, Michigan, Treasurer and Advertising Manager of the Holland Furnace Company. His subject was "Present Problems and Future Opportunities of Our Industry." The high

lights of this address will be published in a later issue.

L. B. Murphy

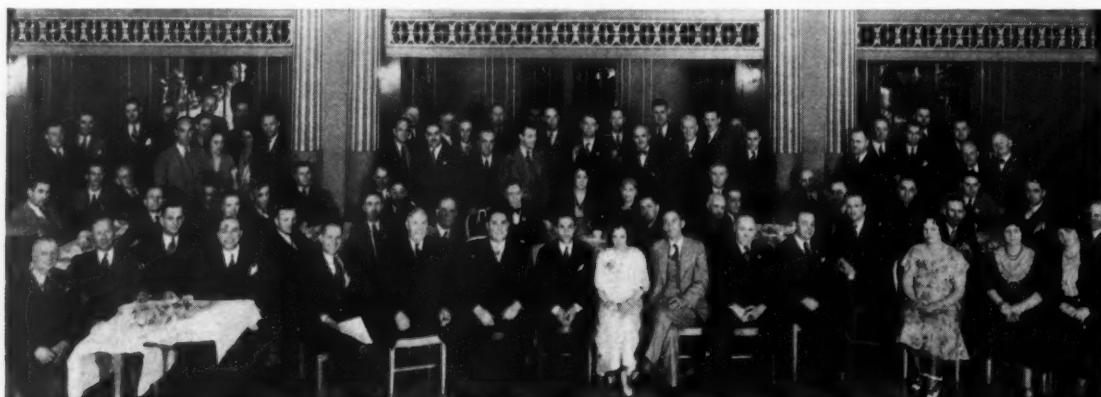
L. B. Murphy, Williamson Heater Company, Cincinnati, Ohio, was assigned the subject "Credits—Manufacturer and Heating Contractor." Just how timely were the points brought out by Mr. Murphy are shown by the excerpts of this talk published. In connection with this address, Mr. Murphy presented a tentative schedule upon which any dealer or, with modifications, prospective purchaser, might list information which would make it practically impossible for the seller to misjudge the buyer's ability or willingness to pay. This credit form is so composed that we cannot reproduce it here, but copies may be secured from Mr. Murphy. Of the many pertinent things set out in the address the important points are published in this issue.

W. L. Rybolt

W. L. Rybolt, Rybolt Heater Company, Ashland, Ohio, spoke ably on "Costs and Selling Expenses for the Manufacturer and Dealer." Quite interesting proved his introductory remarks in which he briefly sketched the development of American industrial life from the

period of hunting and farming, through the early development of agriculture, then the operation of our first banks, their growth and finally the rapidly expanding business era of the years previous to the depression. "In all these stages of growth," Mr. Rybolt said, "gradual control of business assumed increasing importance. Business operation year by year became more complex and more difficult with tremendous advancements and a spreading out with which efficiency and control did not keep step. Within the past few years, and certainly within the past few months, balancing of budgets has become a national pastime. This situation has resulted from a too lax control of business and society with the result that today both business and society are struggling desperately to effect a state of balance."

In concluding his remarks, Mr. Rybolt pointed out how the furnace industry is one of America's essential businesses and that as such this great industry should be a leader to better conditions and more satisfactory service. Such service cannot be given if manufacturers and dealers insist on giving the least in order to lower prices. "Service and leadership," Mr. Rybolt asserted, can come only from sound control of prices. If profits can come only



Members and guests gathered at the evening banquet.

from right prices, then the industry's first concern should be to raise low prices so that profit will accrue to all members of this industry."

F. G. Sedgwick

F. G. Sedgwick presented the report of the Research Advisory Committee. The highlights of this report are published in this issue.

Following the presentation of the report a resume of the research activities of the association at Urbana was presented. These reports are of preliminary nature and are not yet released for publication.

H. C. Murphy

The first speaker of the second day's program was H. C. Murphy, Louisville, Kentucky, who spoke on "Air Pollution and Its Relation to Community Health." Mr. Murphy said among other things that, in winter, when heating plants add to the already serious amount of dirt in the atmosphere, the death rate increases. He declared that, in Chicago, there were probably 1,500 needless deaths each year, doubtless due to this trouble; and that this particular situation seemed to be getting worse everywhere. He quoted Dr. Bundesen, former health commissioner of Chicago, to the effect that 60 per cent more people are dying from disease traceable to contaminated air than all other diseases combined.

Mr. Murphy also reported tests in a number of cities which show from 5,360 to 11,980 dust particles per cubic foot of air. He cited man's daily requirement of 34 pounds of air, 3½ pounds of food and 4 pounds of water, and that, on this basis, the average man is inhaling from a teaspoonful to a tablespoonful of dust and dirt every 24 hours.

The speaker then referred to experiments for development of filters, showing that a filtering element fine enough to clean air thoroughly soon clogs. He stated that washers were helpful but would not remove soot and carbon.

He spoke of the essentials of an

air filter as efficiency in dust removal, low resistance to air flow, large dust holding capacity, ease of cleaning and handling; with weight, strength and permanence also important.

Following Mr. Murphy came a talk by R. B. Leckie, Professor of gas-engineering, Purdue University, on "The Use of Gaseous Fuel in Home Heating."

In introducing his subject, Professor Leckie spoke on the smoke and soot nuisance, urging that from the standpoint of health alone, that anything which would lift the "pall" would be beneficial.

Going on, he spoke of public interest which has developed in the use of gas for house heating, as a result of the highly reliable equipment which has been developed and the ease with which its burning is automatically controlled.

Gas Discussion

Then followed discussion of "The Kind of Gas as Supplied for Domestic Use" and "The Market for Gas-Fired Home-Heating Equipment."

Under the heading, "Methods of Utilizing Gaseous Fuel" there was an informative discussion of gas-designed equipment and conversion burners. Granting the advantages and superiority, as well as existence of a market for the gas-designed unit, the speaker still expressed a belief that, "The ideal domestic heating system, for many years, to come will be one in which the furnace is suitable for the use of solid, liquid or gaseous fuel.

"Perhaps, in time, conversion burners also will be passed on by the A. G. A. laboratories, but so far we are without guidance from the national organization as to what may be considered the essentials of a good gas conversion burner. Yet they are being installed in homes by many of the gas companies, and if by means of good engineering a warm-air furnace manufacturer can produce a home-heating plant that will be highly efficient with any of the three kinds of fuel—solid, liq-

uid or gaseous—it would seem that his product would have distinct possibilities in a market which is being fostered by the oil burner industry and the gas utility companies."

F. Paul Anderson

Next on the program came a talk by Professor F. Paul Anderson, dean of the College of Engineering, University of Kentucky, on the subject of "Keeping Cool." In a most interesting and authoritative manner, Dean Anderson discussed the equipment and processes developed for the purpose of cooling the air in homes, particularly in connection with domestic air-conditioning equipment. Reference was made to various experiments which have demonstrated the complete practicability of thus cooling the air, if the economic side of the problem could be properly served. This included reference to the relationship between wet and dry bulb temperatures, and effective temperature, and the need for dehumidification, at certain times and under certain conditions, as an essential of the cooling process.

Dean Anderson concluded that the most practical recommendation was for direct cooling of only a room or two in the house, as bed rooms at night and living room by day, using a small unit so connected as to make the cooling effect divertible from one section of the house to the other.

B. L. Schwartz

The concluding speaker was B. L. Schwartz of Pittsburgh, Pa., with a most practical and informative address, "The Opportunity for Successful Dealer Activities." With a personal background of individual success as a warm-air furnace installer, securing an excellent volume of good business in highly competitive territory, with many exceptionally fine and completely modernized installations to his credit, Mr. Schwartz offered a talk that was replete with practical suggestions for the building of profitable business.

Report Of Committee On Research

Address of F. G. Sedgwick At Warm Air Meeting

"Let us see what you have done at this Research plant so far—just a few of the highlights:

"1. You have received information leading to the establishment of a reliable furnace rating formula, thus ending a chaotic condition which threatened the very character and reputation of your industry.

"2. You have applied this rating formula to the great majority of the furnaces manufactured today and have seen its recognition by authorities everywhere.

"3. You have secured data which made the Standard Code possible and you have seen the Standard Code secure nationwide recognition as the one reliable formula for figuring gravity furnace work.

"4. You have learned the heat carrying capacity of leaders when they serve first, second and third story rooms.

"5. You have been given much reliable data as to the heat carrying capacities of wall stacks—both single and double, and the most desirable ratios of leader to stack size.

"6. You have witnessed proof of the almost unbelievable overall efficiency of the Warm Air Furnace System as installed under the provisions of the Standard Code.

"7. You have secured efficiency and performance data on various types of furnaces, which are generally accepted in calculations of furnace efficiencies and which are reliable.

"8. You have found that the covering you were using on your warm air pipes is of no value as an insulator.

"9. You have, if you have followed the reports of the Research Staff, secured a world of information on how to install your product and on how to build it to give you and the user the least amount of trouble and the greatest satisfaction. You have saved furnace users enough fuel to more than pay the total cost of the Research.

"10. You have built a Research Residence, the only one of its kind owned by any heating industry—and through this work and with this house you have commanded the respect and cooperation of the foremost authorities in your industry.

"And you have just begun. The biggest and the most interesting work—the most authoritative results—lie ahead of us.

"We have largely finished our gravity work. There is more to do, but we can't wait. Conditioned air—forced air

heating has forced us into bigger fields—far more complicated—far more interesting than those we have plowed before.

"In January of this year a new forced air system was installed in the Research Residence, and a new Research was started according to a program which was approved at our December meeting.

"The American Society of Heating & Ventilating Engineers is cooperating with us in two new Research activities—the first a study of Summer cooling problems which will be carried on in the Research Residence this summer.

"The original cooling will be by ice, because it is the best medium from which to get the necessary results, but it is only logical that research on mechanical refrigeration and other cooling methods will follow. We also expect to get real information on cooling with night air and with basement air and through a standard furnace air washer, using water at various temperatures up to that in the city mains.

"The object of the second test is to determine the cleaning efficiencies and resistances of various types of filters and washers. Professor Rowley at Minnesota, a National authority on this kind of work, will make the tests."

Credits—For Manufacturer and Dealer

Address of L. B. Murphy At Warm Air Meeting

"I should like to begin this discussion by asking this question: 'What proportion of the dealer organization which today are wrecks, or near wrecks, can be attributed to the manufacturer and his laxity in observing sound credit principles?'

"What manufacturer, in his anxiety for business, his greed for volume production, cannot be accused of having said, 'Go ahead and meet the other fellow's price. Go the limit on price and terms if you have to, but get the business.'

"What manufacturer cannot be accused of having said, 'We need the business—go ahead and take a chance on that order; that chap's honest enough; he ought to come through all right.'

"We've all seen enough shrinkage in our Accounts Receivable to convince us that we have been somewhat lopsided in our appraisal of credit risks—or better yet, perhaps, in the inadequacy of the

precautions which we have taken to assure ourselves of the safety of the credit risk.

"We have learned now that the nucleus of every credit policy can be expressed in just one simple word, 'EVIDENCE.' And that evidence must be concrete, not circumstantial, evidence of worth, evidence of conservatism, evidence of sound judgment.

"If nothing else convinces us of the vital necessity for evidence of credit safety and for sensible terms, the very prices alone which seem to prevail throughout our industry should make us realize that the margin just doesn't exist to absorb bad debt losses, or the burden of carrying accounts beyond sixty days.

"We propose for your consideration a standard credit application form for the use of the manufacturing members of our Association and another for the use of the Contractor member.

"These forms are offered as a possible means of accomplishing, as a group, what might not be possible of accomplishment by the individual dealer or by the individual manufacturer. A great deal of educational work doubtless will be necessary not only in obtaining the full support of the manufacturing members in using the form, but in encouraging the dealer in furnishing the information called for. It can only be made a reality by means of a *united front*, so that the dealer will be required to furnish the information, no matter which way he may turn for credit.

"This proposal is not aimed at the legitimate or the qualified purchaser, whether consumer or dealer. It is essentially dedicated to the cause of assisting the seller in sifting out and avoiding relations with that minority of buyers who are *unqualified* or *undeserving* to seek credit accommodation."

DISTRIBUTORS

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How To Obtain Net Profits Today

An Address by Harry Arthur Hopf at
the Recent Meeting of the National Asso-
ciation of Sheet Metal Distributors

OUR nation, the wealthiest in the world, finds itself today in the throes of a business depression which, according to many authorities, exceeds in length and severity any similar depression on record. It will be of interest in order to visualize clearly the facts, to consider briefly certain basic criteria of the business situation.

Analysis of Conditions

According to the latest published reports, the following adverse conditions have manifested themselves:

Wholesale commodity prices, according to the Analyst Index (May 3rd, 1932), have declined to 89.7, the lowest point since May, 1908; however, many commodities are actually at the lowest prices of the century, so far.

Construction activities, usually a measure of economic progress, shrank in the first quarter of this year to \$286,078,700, the lowest volume since 1914.

Department store sales volume has receded to the levels of 1919.

The Index of Factory Employment, which, at the beginning of 1931, was already at its lowest point since the world war (74.6) stood at the beginning of the current year practically a full 10 per cent lower (64.8).

Unemployment, as estimated by William Green of the American Federation of Labor, on the first of May of this year had reached the unprecedented figure of 7,950,000. The loss in wages and salaries implied by this figure may be conservatively estimated to represent a loss in domestic purchasing power of over one billion dollars a month.

Export trade during the last calendar year amounted to less than two and a half billion dollars, the lowest point since 1914.

Finally, to give you an over-all figure, the Analyst Index of Business

Activity for March, 1932, had dropped to 61.6, the lowest point on records which go back to 1879.

Admittedly this is a dark picture; nevertheless, in the words of one authority, "In spite of the formidable difficulties produced by the most prolonged and severe deflation on record, our economic structure has thus far stood this unprecedented strain fairly successfully and is still surprisingly strong."

And so, frankly facing the extreme uncertainty of the immediate future, permit me to set before you as a postulate that, regardless of the course of general business for the short term or the long term outlook, the future of the individual business depends, as never before, upon the quality, foresight and resourcefulness of its management.

No matter how good or how bad business is at any given time, some institutions will fail, others will manage to hold their own, while still others will forge ahead and prosper. In this connection, you perhaps saw in last week's issue of the Business Week, a list of ten companies whose first quarter earnings for 1932 exceeded their 1931 records. The experience of most, if not all, these companies, was contrary to the trend of the various industries of which they form a part.

These figures lend point to the statement that the difference between the success of one organization and the failure of another—

both engaged in the same business at the same time—is, all factors considered, the difference in the quality of their management.

What Is Management?

It is fitting at this juncture to take a moment to define what is meant by "management." Let me ask you, then, to regard management as the conscious direction of a definite force toward the achievement of a predetermined objective.

I have said that there must be a predetermined objective. From the practical point of view it is the responsibility of the management to determine, as accurately as possible, what it expects to accomplish with the undertaking in hand, in terms of Production, Sales and Gross and Net Profits. These four factors constitute the composite objective of management, and to their achievement it must address itself with all its energy, talent and aggressiveness.

I have said that a definite force must be directed. What is this force? What does it mean in terms of a given business? We may readily agree that it is composed chiefly of three factors; Personnel, Organization, and Good Will. The factor of Personnel should be regarded as composed of at least four groups, each with radically different characteristics which must be harmonized in action. Executive,

Sales, Production and Administrative Personnel are all parts of this factor; simple designation of these groups will convey an appreciation of the difficulty of the essential welding process.

Organization

The factor of Organization covers the relationships of individuals and activities to one another, and to the entire structure of the institution and its capacity for coordinated action. Problems of integration among the head office, factories, branches, and distributing points; the extent to which the work has been brought within the compass of performance by persons of average capacity; the closeness of the power of decision to the point of action; the condition of plant and equipment; the size of inventory; the extent of operations; the status of development of methods of procedure and control—these are some of the elements which I have in mind under the factor of Organization.

Good Will represents the summation of all these efforts of management along every line of activity within the legitimate sphere and is therefore, a powerful, though intangible factor, which, if properly directed, will be of immense aid in propelling an institution forward upon the path of success. Particularly is this true in times of reduced business activity, when the cumulative effect of good will developed in the past may be counted on to reveal itself in unmistakable fashion.

Last, *conscious direction* must be supplied. This brings us face to face with the task of the one who directs, namely, the chief executive. Conscious direction implies an assurance on his part of the existence of the art of management and a full understanding of the tools which are available for utilization as he exercises his responsible function. It implies, furthermore, the obligation of the chief executive to guide the destinies of the institution through the application of three vital faculties, intelligence, planning and leadership.

The chief executive must, first of all, be thoroughly informed as to the conditions which he faces; he must furthermore, provide a practical plan for action, and finally, he must manifest possession of the qualities of a leader. This means *not* that he need be technically competent to operate all departments of his organization or even any one of them, but rather that he should possess the ability to initiate, to stimulate, to guide, and to coordinate.

It is my judgment, based upon experience with business organizations in many different fields, that

Every manufacturer and distributor wants to make money. But just how to go about the matter is something too few executives have time or ability to analyse. This address was declared by members of the National Association of Sheet Metal Distributors to be the best analysis of present business conditions they had ever heard or read. If so, there should be many points of value to you.

if any indictment may be leveled against management in America today, it will be found in the failure of many otherwise capable executives to measure up to the qualifications I have just described.

Making Money in 1932

In the halcyon days prior to the stock market debacle, profitable results meant one thing; but today, and quite likely for some time to come, this term must be re-drafted in the light of the situation faced by management in any given institution. Reducing losses; deflecting the unfavorable trend; cutting operating costs; recapturing lost business; conserving the cash position; avoiding undue credit losses; holding the organization together; maintaining reasonable price levels—these are some of the results

which, within controllable limits, management must achieve in order to give a satisfactory account of its stewardship. The payment of dividends to stockholders (even though on a reduced scale) is today not the only gauge of profitable results.

Internal Organization

Instead of looking for new worlds to conquer, the 1932 brand of management will find it essential, in the cause of self-preservation and progress, to turn the searchlight of analysis inward and to understand that the first step in the direction of profitable results is recognition of the internal problems with which it is confronted. In considering their scope and significance, five major fields of exploration will be found to exist:

1. The product and its manufacture.
2. Distribution and sale of the product.
3. Financing of the business.
4. Perfecting of the organization.
5. Stimulation and development of the personnel.

In all of these fields, even during our most prosperous periods of business, problems have existed, and will continue to exist, regardless of business conditions. A keen, intelligent, all-embracing diagnosis, resulting in recognition of the present status and of the various elements of strength and weakness inherent in the situation, must be the first step in any program designed to bring conditions under effective control.

Coupled with recognition of the problems there must be a firm resolution or determination to put forth every possible effort in order to achieve their solution. Translated into action, such effort would result in the adoption of a comprehensive and practical program calling for:

1. Full delegation of responsibility, with requisite authority, throughout the organization, beginning with officials and department heads and working down through division heads and foremen to the rank and file.
2. Coordination of effort and cooperation among the departments and within the departments.
3. Accurate knowledge of costs and effective methods of cost control.

4. Establishment of standards of production.
5. Adoption of a sound policy of pricing for profit.
6. Installation of a carefully worked out plan of budgetary procedure and control.
7. Furnishing of incentive to executives and to workers of the rank and file.

As never before in the history of American business, courageous and far-seeing leadership is the demand today.

This brings me then to consideration of the attitude of the chief executive, the prime motivating force in the attainment of profitable results.

The Executive's 1932 Attitude?

I regard correct thinking on the part of the chief executive as fundamental to the attainment of profitable results by his institution. Categorically speaking, I believe that in order to guide his organization successfully during the present year, the chief executive should accept the validity of the following propositions and be governed by their implications:

1. That there is a market for any product which is meritorious, *provided it can be sold at the right price*.
2. That selling at the right price means:
 - a. Modification of policies and practices in line with the changing requirements.
 - b. Perfecting of organization, processes and procedures.
 - c. Knowledge of costs and setting of standards.
 - d. Thorough study of the market and cultivation of the most propitious territory.
 - e. Thorough study of consumer wants and willingness to be guided thereby.
 - f. Thorough study of channels of distribution and adoption of the most suitable.
 - g. Thorough study of the product and making of such changes as are needed to meet changing needs.
 - h. Adoption of a price quality which permits of quality maintenance and of reasonable reward of labor, management and capital.
3. That curtailing of expenses is not necessarily economy, and that, vice versa, the adoption of certain new expense commitments may be profitable.
4. That the very best time to undertake improvement of any kind is in a time when business is compara-

- tively slow and the opportunity is afforded for painstaking study and purposeful application to activities which, under busy conditions, are usually set aside in favor of more immediate operating necessities.
5. That plant, personnel, methods and plans should be brought up to the point where the organization will be able to take advantage of increasing business without delays or loss.
 6. That the personnel, particularly of executive grade, required for normal business shall be kept intact, even at a sacrifice of profits.
 7. That all the ability in the organization should be capitalized, and that everyone should be given tasks which will tax the best that is in him.
 8. That all waste in production, distribution and production should be eliminated.
 9. That old machinery and methods in vogue for many years are under suspicion of not being adapted to present day needs.
 10. That that business organization will continue to get business which gives a demonstration of sound management by selling quality, and giving prompt and satisfactory service at a price which reflects a reasonable profit based on satisfactorily controlled costs.
 11. That prophets of gloom and despair will engender gloom and despair—that enthusiasm and sane optimism alone can keep a business moving.
 12. That courage is needed to lay out new paths of progress and to keep the business machine on the road and moving at a safe speed toward the established goal.

It is my conviction that the proposition which I have advanced are all basically sound, and that to accept them and be guided by them in planning and performance is the way to obtaining net profits in 1932. To follow that way sincerely, enthusiastically, and with determination, constitutes a challenge to even the ablest executives presiding over the organizations here represented.

Practical Steps to Net Profits

Perhaps the philosophy which I have sketched for you, even the practical steps which I have enumerated, may seem a difficult goal, and to encompass a sweeping field.

And yet, shall we say that because the road to profits is hard to travel, we will not pursue it? The answer is clear, and let me assure you that once the first courageous step is taken, the next will be easier.

It may be interesting to know what steps other business organiza-

tions are taking to achieve improved profits in 1932. Recently, the New England Council, a body which is doing outstanding work in promoting industrial effort and accomplishment in its section of the country, conducted a survey to ascertain that very thing. The figures which were given to me as the result of analysis of 853 ballots returned up to February 1st, indicate that the following measures had been determined upon as those on which the companies in question would rely for improved profits:

A. In Selling:

- | | |
|--|-----|
| 1. Reducing expenses other than wages and salaries.. | 589 |
| 2. Reducing wages and salaries | 285 |
| 3. Increasing volume of sales | 528 |
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ASSOCIATION Activities

Milwaukee Association Meetings

We are indebted to Paul Biersach, secretary, for recent reports of the activities of the Milwaukee local associations. Following are some of the highlights of these meetings:

"We have had some wonderful meetings during March, April and May. At the March meeting we had Jack Stowell, who enlightened the boys on the code and his method of doing business. We also had ten of our members submit a quotation on a furnace installation; the bids were opened at the meeting and spread on the blackboard, itemized and then discussed. At the April meeting G. G. Zingsheim, enlightened the boys on air conditioning and its computation. Mr. Zingsheim gave a detailed blackboard demonstration and the boys went away feeling that they had spent an educational evening. At the March meeting, Henry Hotton of the L. J. Mueller Furnace Co. gave us another talk on forced air furnace installation and had a blue print for each one that attended so that all could follow him very easily.

"At the June meeting we will have the American Brass Co. show their films on the manufacture of sheet copper and during the same evening, we will have as our guests, the representatives of the jobbers and manufacturers in this locality.

"The School Board of the City of Milwaukee wants to adopt an emergency employment plan on labor and they are contemplating to put into effect a two-shift, five-hour day for all crafts to be employed on contract work. Some objections have been raised by the various crafts.

"Some of the other crafts have suggested a six-hour day, five days per week as a substitute in place of the two-shift, five-hour per day.

Indiana Fur-Mets Meeting

At the recent meeting of the Indiana Fur-Mets, Director Geo. A. Kelly of F. Meyer & Bro. was elected a director to fill the unexpired term of A. C. Selvig and F. A. Wilkening of the Standard Metal Co. was chosen as chairman of the board.

Fur-Mets voted to write every Fur-Met prior to the Lafayette District Meeting June 24th, urging attendance. They also discussed the possibility of

getting out a Fur-Met Roster, and seemed to favor combining with the Contractors' Association Roster, rather than getting out an additional one. The Roster matter was held over for future consideration.

A special committee was appointed to offer Fur-Met cooperation to the Indianapolis Association for the Annual Picnic July 30th, consisting of Bill Meador and Bill Shea of Tanner & Company, and Bob Renick and Harry Jones of the Standard Metal Company.

Western Hot Air Club Meets

Inasmuch as all of the officers of the Western Hot Air Club and some of the more or less important members were present at Columbus on the evening of Wednesday, May 18, attending the National Warm Air Convention, an impromptu meeting was called by President Herb Symonds. In the absence of Harvey Manny, whose self-appointed task it has been to gather the members at these various meetings, Blair Quick officiated with the assistance of Ernie Fox, Rudy Menk, Homer Brundage and Fred Bishop, aided by First, Second, Third, Fourth Vice-President George Harms, Treasurer John Fehlig and Sergeant-at-Arms Earl Nesbitt.

Apparently they did not do such a good job, at least not as efficient a job as Harvey Manny might have done, as among the most conspicuously absent was the usual box of cigars donated by Etta Cohn. Inasmuch as Miss Cohn was at the hotel it was unanimously voted that Blair had been lax in his duties, but the treasurer rose to the occasion and agreed to part with enough of the Club's funds to buy smokes.

The Western Hot Air Club, which is sponsored by members of the old Western Warm Air Heating Association, is purely a social organization with no set rules, no definite meetings, and no special qualifications for membership except a \$2.00 bill each year.

What the meeting lacked in attendance was more than made up in good fellowship. It is planned to hold the next meeting in December at Urbana during the annual convention of the National Warm Air Heating Association.

Committee of Ten to Hold Convention

The annual meeting of the Committee of Ten will be held at the Medinah Athletic Club, Chicago, at 10 a. m., Monday, June 20, 1932.

It is planned to turn the meeting into a sort of an informal convention, to which coal producers, wholesalers, retail merchants, related equipment manufacturers, dealers or representatives, railroad representatives and others are cordially invited.

Chairman H. A. Glover will report on the work and aims of the Committee, and informal talks on plans and needs will be made by representatives of the various member industries. All discussions will be open to any one in attendance.

Indianapolis Gravity Heating School

The Indianapolis Association Sheet Metal & Warm Air Heating Contractors has just completed a school on gravity heating conducted by Guy A. Voorhees. This school lasted six weeks and included a presentation of the principles and formulas applicable to gravity warm air heating and an interpretation of the new City Code. Inasmuch as the new City Code is practically the National Standard Code, the lessons were of unusual interest.

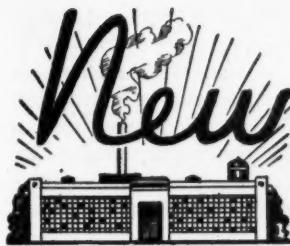
The school was open to all of the members of the City Association and was well attended.

Another school is contemplated covering fan heating and will likely be thrown open to members of the State Association as well as the City Association.

Indiana Lafayette District Meeting

District Governor W. F. Strate announces that the meeting of the Lafayette District has been set for Friday, June 24th, at 6:30. The meeting will be sponsored by the State Sheet Metal and Warm Air Heating Contractors' Association, but will be open to everybody interested in the sheet metal and furnace trade.

The purpose of this meeting is purely social. No business will be transacted.



New PRODUCTS

L. J. Mueller Announces Climator III

The L. J. Mueller Furnace Company, Milwaukee, Wisconsin, has just announced the addition of the CLIMATOR "III," to their line of air conditioning equipment. This unit consists of a combination of fan, air washer and filters, enclosed in a single, compact casing, suitable for use with any type warm air furnace, with either new installations or for addition to existing gravity jobs, to provide complete air conditioning facilities.

Climator "III" has been designed to meet the need for a complete unit which can be quickly and easily installed, and



of such dimensions that it may be taken through a 2-foot 6-inch door.

A larger diameter fan, of improved design, has secured performance which permits the use of efficient filters and washer, and the connection of complete recirculating ducts. The fan delivers the requisite volume of air against the resistance necessary to secure an efficient, balanced installation.

Simplicity of design and manufacturing economies have resulted in a thoroughly high-class unit available at reasonable cost to homeowners. Illustrated and descriptive literature and price data are available upon request to the L. J. Mueller Furnace Company, 339 South Second Street, Milwaukee, Wisconsin.

New Electric Screw Driver

As the result of repeated demands since their small electric screw driver with the adjustable tension clutch was placed on the market, The Stanley Electric Tool Company, New Britain, is now offering two larger sizes with this type of clutch.

Type No. 31 drives screws as large as No. 12—2-inch in hardwood with proper size lead holes. It may also be used with socket wrenches to run on nuts.

Type No. 32 will drive screws up to No. 16— $3\frac{1}{4}$ inch in hardwood and lag screws up to $\frac{1}{8}$ inch by 4 inch with proper size lead holes. With socket wrenches it will run on nuts up to $\frac{3}{8}$ inch.

The adjustable tension clutch has seven distinct features according to the manufacturer.

1. Releases at exact pressure for which it has been set.

2. Prevents sinking screws too deep into wood.

3. Sets screws up tight to work.

4. Prevents marring the surface of the work.

5. Eliminates hazard of overloading motor.

6. Eliminates stripping threads.

7. Prevents damaging screw slots.

Complete information and literature may be obtained from the company.

Robinson Oil Burning Air Conditioner

The Robinson Furnace Company, 213 West Austin Avenue, Chicago, Illinois, announces a new air conditioning unit which is entirely complete in itself.

The unit is a new type oil burning furnace designed with long fire travel and a ratio of heating surface to grate area of 35 to 1. The furnace is square cased and finished in crackle green paint. A special Ben Franklin oil burner has been made a part of this furnace with the fire and combustion chamber especially designed for this burner and for oil burning. The burner stands on the basement floor outside the casing.

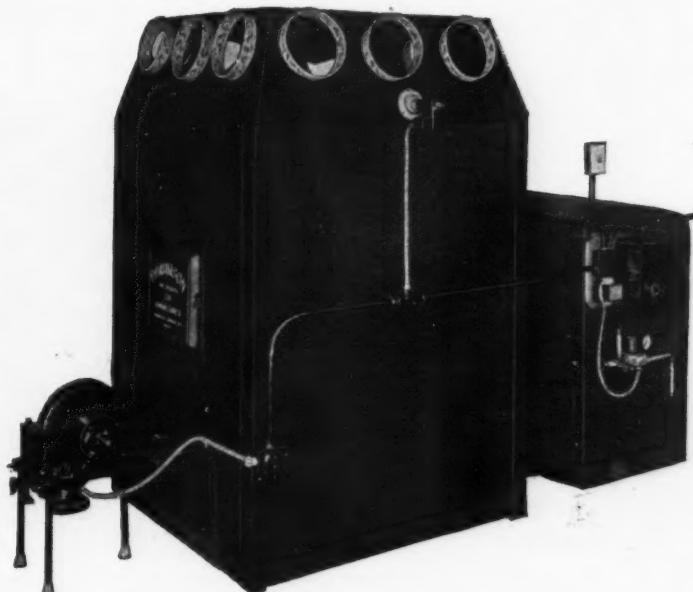
The air conditioning unit is attached to the rear of the furnace and consists of an air washer below a centrifugal type blower. The motor is direct connected.

The washer is unusually compact and uses two spray heads. Above the blower there are two sections of dry air filter. Eliminator plates remove all globular moisture before the air passes into the furnace.

Full controls, including room thermostat, room humidistat, fan bonnet control, and solenoid valve for the washer are included with the unit.

The unit will be supplied in three sizes rated 20-22-inch, 24-26-inch and 29-30-inch furnaces. Against $\frac{1}{8}$ -inch static pressure the three sizes will be—1500 c.f.m. at 1100 R.P.M.; 2500 c.f.m. at 800 R.P.M. and 4700 c.f.m. at 700 R.P.M.

Details of the new conditioner are contained in a leaflet which may be obtained from the manufacturer.



Vernois Gas Floor Furnace

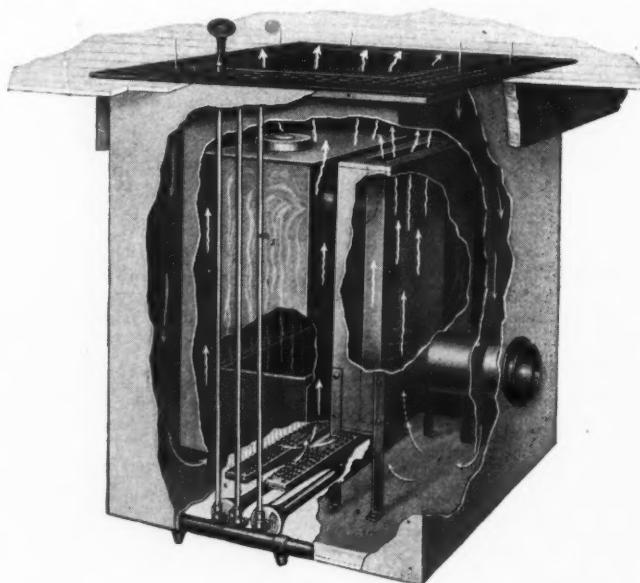
Mt. Vernon Furnace and Manufacturing Company, Mt. Vernon, Illinois, has placed on the market a new gas floor furnace which can be used as an auxiliary for the central plant for spring and early fall use when a full furnace is not necessary, or in steam and hot water heated homes for large rooms, distant sections of the house or as an auxiliary. The unit is also suitable for small, one-floor, homes.

The unit is controlled and regulated by a key which comes through the register. In operation the unit works on gravity flow, with cold air passing

through the outside section of the grille to the bottom of the heating chamber and out into the room through the central area of the grille.

The fire box and radiation chamber are entirely separate from the circulating air chamber and are gas tight. Fumes and burned gases pass out through a vent into the chimney. The fire box has cast iron linings and the fire box and radiation chambers are vitreous or porcelain enameled for protection against rust.

Suitable literature describing the new unit has been prepared and can be secured from the manufacturer.



Two New American Furnace Filters

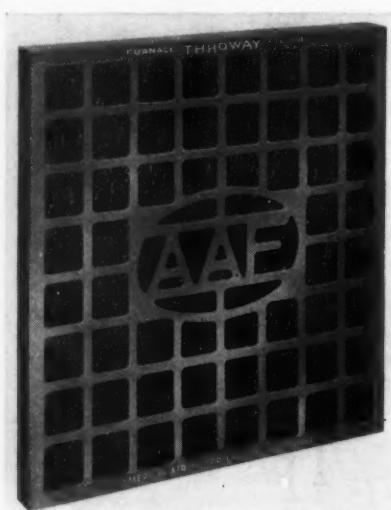
The American Air Filter Company, Inc., Louisville, Ky., has recently introduced two new filters designed especially for warm air heating systems, air conditioning units, room coolers and unit ventilators.

The filtering medium in both filters consists of fabricated split wire woven by special process into pads of the proper size and thickness.

In the Throwaway type the filter pad is contained in a cardboard casing, making it practical to throw away or de-

stroy the entire filter when it has accumulated a sufficient quantity of dust to restrict the air flow, and replace it with a complete new unit.

The Re-Nu filter is semi-permanent since the renewable filter pad is contained in a metal casing having expanded metal covers. The filter pad is easily and quickly renewed by simply re-



moving two screws and lifting the cover from the casing.

Both Throwaway and Re-Nu filters are particularly well adapted to gravity circulation in warm air heating systems since the split wire filtering medium has a low initial resistance and a high efficiency in dust removal even with low air velocities.

These filters are made in two standard sizes—20 by 20 and 16 by 25—but will be furnished to manufacturers of heating or air conditioning equipment on quantity orders in special sizes to meet their requirements.

New Company to Manufacture Controls

The Automatic Products Co., 121 N. Broadway, Milwaukee, announce their entrance into the Automatic Control field.

R. W. Johnson, President, was formerly Vice-President in charge of production of the Time-O-Stat Controls Company. A. E. Petersen, in charge of sales, was formerly in charge of sales of gas equipment for Time-O-Stat.

It is the company's plan to manufac-



ture equipment through distributors and have appointed the Preferred Utilities Manufacturing Corp., 33 West 60th St., New York City, distributors for the New England States, Eastern Pennsylvania, and Eastern New York; and the R-O Distributors, Inc., 775 Main St., Buffalo, New York, distributors for Western New York and Eastern Pennsylvania.

Two new items are being manufactured—a room thermostat said to possess the following features: Exceptionally attractive appearance, operation cycle not to exceed 2 degrees, one wall hole installation, 55 to 85 degree range and magnetic snap action.

The heat regulator motor is compact, rugged, has no brushes, requires no lubrication, is completely enclosed, and easy to mount. A separate transformer can be purchased.

Literature describing the units can be secured from the company.

News Items

Moosehart to Graduate Five Boys

The progressive contractor who has kept abreast of the changes taking place in the trade has found it necessary and advantageous to train the men of his organization perhaps not as much in mechanical skills as in technical information, standards of construction and salesmanship.

The trade needs and is demanding a type of apprentice capable of assimilating such training, for it is the apprentice of today who will be the mechanic of tomorrow and this apprentice is the most logical employee to receive the necessary training.

Mooseheart, the home and school for dependent children of deceased members of the Loyal Order of Moose, has for years maintained a sheet metal department for the training of student-apprentices. The work of this department has been given credit for its efficiency. Many graduates have entered the trade and made good in the past.

This year five boys will graduate from this department and all wish to enter the trade in a shop where they will be given an opportunity to complete their training. All of the boys have spent four years or longer in the shop, their time being divided between their vocation and academic school.

In addition to their trade training each of these boys will graduate with a diploma from a fully accredited high school.

They are all approximately 18 years of age, well developed, clean mentally and physically and ambitious.

Each of them have had six months' experience on buildings under construction at Mooseheart working under the direction of experienced mechanic-instructors.

These student-apprentices will be available to the trade on or about July 1. They must become self supporting at

once and must be guaranteed steady employment. They will go to any part of the United States where employment is available.

These boys are not mechanics but they have received training and have had experience that should prove of the greatest value to the progressive sheet metal contractor who will undertake their final training.

Any contractor interested may secure additional and specific information by writing,

J. A. BRANDT, Instructor
Mooseheart Sheet Metal Dept.
Mooseheart, Illinois

McFate, Assistant Sales Mgr., Wheeling Steel Corp.

William M. McFate has been appointed assistant manager of sales of the tin plate division of the Wheeling Steel Corp., Wheeling, W. Va. He has been with the Wheeling Company for several years and had previously been connected with the Detroit Steel Corp., Weirton Steel Co., and the former Trumbull Steel Co., his experience with the tin plate industry having started with the latter company in 1913.

Conditioned Air Corp. Organized

The Conditioned Air Corp., Ford Building, Detroit, Mich., has been organized to build and install air conditioning equipment in residences and other buildings. A central system, the Airco, has been designed to humidify, cool, wash and heat air for residential application. Officers of the company are: President, G. L. Schuyler; vice-president and treasurer, Joseph Sherer, Jr.; secretary, F. S. Ford. Sales representatives have been appointed in New York and Cleveland, and plans are under way to extend the distribution to other cities.

***There's furnace business to be had
if you offer the—***

AKRON AIR BLAST

Your customers are buying, but not with the reckless abandon characteristic of buyers a few years back. Then you sold furnaces without much selling effort, but today orders for furnaces are placed only after the buyer is certain he is getting the utmost in workmanship, materials, and design. And incidentally these features combined with an attractive price bring business home to you.

The "Spend for the Home in 1932" movement is resulting in replacements of heating equipment that you should be getting a share of. This coupled with the fact that air conditioning has actually taken hold adds to the possibilities of your market.

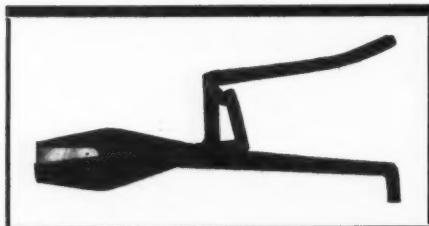
Why not make a concentrated effort to get this business. Go out after it.

Explain the many features of the AKRON AIR BLAST. Show prospects how air conditioning functions at maximum with the AKRON AIR BLAST.

You'll get business. Because others are getting it.



THE MAY-FIEBEGER CO. NEWARK, OHIO



AIR CONDITIONING *has unlimited possibilities for YOU these days » »*

Air Conditioning, the latest and most outstanding agent of health, comfort, and convenience is creating a tremendous volume of business for sheet metal workers.

It creates a new standard of living and the user has been responsive to its appeals since its inception.

Get your share of air conditioning work, and

incidentally fortify yourself in your cutting and trimming operations by working with the Viking Shear, a shear with an appeal like air conditioning.

Built of the finest materials with special features built-in and backed by our guarantee, you will find the Viking

outstanding as a money saver on the small or large job.

Send for Particulars

VIKING SHEAR CO., ERIE, PA.

The
VIKING
Shear

MONCRIEF FURNACES

Distributed By

Chicago Furnace Supply Co., Chicago, Ill.
Moncrief Furnace Co., Indianapolis, Ind.
The F. H. Lawson Co., Cincinnati, Ohio
Johnson Furnace Co., Kansas City, Mo.
E. A. Higgins Co., Omaha, Nebr.
J. M. & L. A. Osborn Co., Buffalo, N. Y.
Geo. H. Cole Supply Co., Troy, N. Y.
W. H. Landers Co., Syracuse, N. Y.
Springfield Plumbing Supply Co., Springfield, Mass.
Sheet Metal Supply Co., Milwaukee, Wisc.
Northern Metal and Mfg. Co., Green Bay, Wisc.
Schrader-Easley Co., Memphis, Tenn.
Marshall-Wells Co., Duluth, Minn.
Rhodes Mfg. Co., Grand Rapids, Mich.
Moncrief Heating Co., South Bend, Ind.
Moncrief Heating Co., Youngstown, Ohio

Eastern Office
2134 Market St., Philadelphia, Pa.—E. L. Garner, Mgr.

Pacific Coast Representative
McPherson Furnace & Equipment Co., Seattle, Wash.

Branches at
Pittsburgh, Pa., and Ashtabula, Ohio

The Henry Furnace & Foundry Co.
3471 East 49th St. Cleveland, Ohio

News Items

W. E. Lamneck Receiver Sale

At the receiver's sale of the W. E. Lamneck Company in Columbus, May 19, 20 and 21 no bids were offered for the assets as a whole including real estate. There was no bid on real estate alone. The highest bid received for the assets as a whole, exclusive of real estate, was \$41,000. The assets were then offered in parcels and received an aggregate bid of \$43,639.24. No bids were received on merchandise appraised at approximately \$35,000.

The receiver reports that he conferred with all creditors and that subsequently all bids for merchandise and miscellaneous items amounting to approximately \$25,000 will be accepted with the receiver permitted to reserve such portions as will best serve the estate. All bids for the remainder of the property are rejected.

F. Meyer & Bro. Co. Oldest Salesmen

The two distinguished gentlemen in the photo are, believe it or not, furnace salesmen. Left, Max Baugh, recently elected treasurer of the Illinois Travelers' Auxiliary for the eleventh



time, and right, Jack Sauer, one of the auxiliary directors. Max has been with the Meyer company sixteen years and Jack fifteen.

Detroit Edison Will Study Comfort Cooling

The Detroit Edison Company is investigating the subject of comfort cooling, according to Sterling S. Sanford, sales engineer of the company.

To give a practical demonstration of comfort cooling, the company is installing equipment in five of its commercial offices this year. Three of these offices will be cooled with ice; one by a carbon-dioxide compressor installation, and one by eight direct expansion cooling cabinets served by three compressors.

The company does not plan to market the equipment, but is stimulating interest in comfort cooling and informing customers about the various methods of cooling.

An eight room house has been selected and the company will install ice equipment to cool it for public show purposes.

News Items

J. G. Wimmer Opens New Shop

J. G. Wimmer, who has been superintendent of the furnace and sheet metal shop of the Barrett Hardware Company in Joliet, Illinois, for the past 17 years, has opened his own shop at 428 State St., Lockport, Illinois.

Mr. Wimmer announces that he will handle Torrid Zone furnaces and air conditioning units and will specialize in domestic air conditioning installations and residential sheet metal contracting.

American Air Filter Representative

American Air Filter Co., Inc., Louisville, announces that English & Lauer, Inc., 1224 South San Pedro Street, Los Angeles, have been appointed Southern California representatives of the company, handling their complete line of air filtering and dust control equipment.

Inland Steel Opens Detroit Office

Inland Steel Company, Chicago, announces the opening of offices at 1118-19 Fisher Bldg., Detroit, Mich., and the appointment of J. H. Fitch, Jr., as District Sales Manager of this office.

This marks Inland's first entry into the Detroit area during the last ten years, and is directly related to the recent installation and completion of a large Continuous Strip Sheet Mill, which produces auto body sheets and various other strip and sheet products used in the automotive industry.

Mr. Fitch started his career in the steel business selling

tin plate for the Liberty Steel Company in 1918. A year or two later, he left this company, when it was sold to the Trumbull Steel Company, and with others, organized the Newton Steel Company at Newton Falls, Ohio. He served as Treasurer, Vice-President and Director of this company from its inception, until his resignation on April 1st of this year.

Long Time Reader Burned Out

Bernard Pauwen & Co., 5 North Lavergne Avenue, Chicago, sends in word that the company's Chicago office, including records reaching back 22 years, was recently wiped out in a fire. New offices will be opened shortly.

New Dehumidifying Compound Reported

A chemical compound, said to have properties which make it valuable as a dehumidifier in air conditioning processes, has been developed in the metallurgical laboratory of the Peoples Gas Light & Coke Co., Chicago, under the supervision of Robert G. Guthrie, chief metallurgist, and Dr. Oscar J. Wilbor, research chemist. The material has been named lamisilite by its discoverers, because of its laminated structure and siliceous nature.

Lamisilite can be produced at low cost, and a small amount of it is as effective as much larger amounts of the materials now in use, it is claimed, which makes possible a reduction in size of the apparatus. The actual composition of the compound has not been revealed.

Air from the rooms is drawn first through a spray of water, where dust and odors are removed, and then passed over a bed of lamisilite, from which it is delivered cool, dry, and odorless. After it has become saturated, the material is dried out by the application of heat from a gas flame.

DEALERS "CASH IN" NOW!! *Sell Conditioned Air*



AN IDEAL COMBINATION

*The Hess Air Conditioner with
Hess Welded Steel Furnace*

The Hess Air Conditioner consists of air filter, blower, air washer and humidifier all in one cabinet, beautiful baked enamel finish. It may be used with any warm air furnace or radiator heating system, to provide year 'round comfort economically.

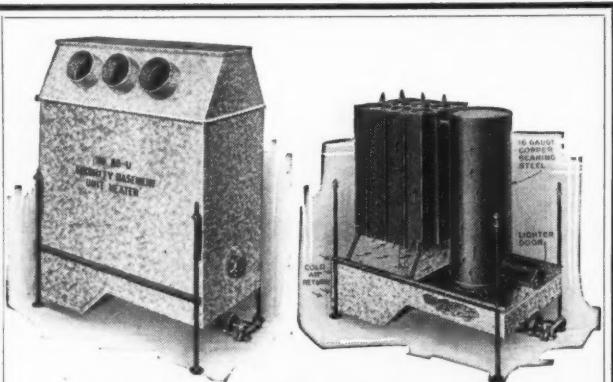
A tremendous market with real profits faces the dealer. Will you grasp the opportunity to "cash in" now or will you let this business slip thru your fingers?

Each day home air conditioning is receiving widespread publicity. It is up to the live, wide-awake furnace dealer or heating contractor to establish himself in this line of work at once, unless he will allow himself to be obscured by others.

Don't delay any longer. The Hess Air Conditioner establishes you immediately in the home air conditioning market. It is a complete unit—nothing extra to buy, and can be used with any heating system.

Besides this, we have a selling plan that works. Write for full particulars at once.

**HESS WARMING & VENTILATING CO.
1201-1211 SO. WESTERN AVE.
CHICAGO ILLINOIS
BRANCHES: DETROIT & MILWAUKEE**



SECURITY UNIT HEATER

For Natural or Artificial Gas

An inexpensive but durable and highly efficient gas furnace. Made in 3 sizes. The larger size has 350 sq. in. Standard Code pipe area. One unit for small cottages or two or three units for larger homes.

GAS FURNACES

\$25⁰⁰ to \$55⁰⁰

The Perfect Heating Unit

for Churches, Schools, Garages, Halls, Stores, Etc.

When used in garages suspend from ceiling and save floor space. If no basement space is available only a small excavation is necessary.

These heaters come set up complete ready for installation. Can be carried through any basement doorway.

SECURITY STOVE & MANUFACTURING CO.
Kansas City, Missouri

Breuer's Ball Bearing 1932 TORNADO FURNACE CLEANER

Complete
With These
10
Attachments

Now
Reduced to
\$139.50
F. O. B.
Chicago



WHAT GOOD IS A FURNACE CLEANER WITHOUT THE RIGHT TOOLS?

You must have all of these 10 tools to clean thoroughly all types of warm air furnaces and hot water boilers. \$29.75 worth of extra attachments—that's what you get with a TORNADO Furnace Cleaner at no additional cost! They save approximately one hour on every cleaning job. Think what this means to you in extra profits.

Actually a one man outfit—100 per cent portable—weight only 30 pounds—a real, heavy duty commercial cleaner, not a household type as used for carpet cleaning.

Far greater vacuum cleaning power—proved by comparison—1/2 H.P. G.E. Motor—ball bearing throughout—no oiling.

Removes all loose dirt from air system without taking down pipes—an exclusive BLOWER feature of the TORNADO.

We invite comparison of the TORNADO point for point—price, portability, weight AND POWER. We will ship the TORNADO on three days' free trial—no obligation—so that you can test our claims.

When you purchase a TORNADO you get more than a machine—we supply the advertising and a complete furnace cleaning sales plan free with which to build an attractive business and profit. Most users tell us the TORNADO pays for itself in a few weeks' time. Write today for complete information.

BREUER ELECTRIC MFG. CO.
865 BLACKHAWK STREET CHICAGO, ILLINOIS

New Literature

Forest City Foundries Literature

The Forest City Foundries Company, Cleveland, Ohio, has a number of pieces of new literature which dealers may be interested in having for their equipment files.

The most impressive piece is a handsome booklet "The Volume Gas Heating and Air Conditioning Market." The booklet is divided into several sections—the first describing the market and sales possibilities of auxiliary furnaces. The reading material analyzes this field and describes how the Niagara Auxiliary can be sold to supply this need. The second section describes how batteries of auxiliaries can be used to meet a demand for complete gas heating after the first unit is sold. The third section describes the small gas furnace and its construction. The fourth section is devoted to the series 110 air conditioning furnace and the Senior line of units.

The company has also prepared a number of leaflets, some in sizes suitable for inclusion in billing envelopes and others for direct mailing to home owners. All these leaflets use modern bright colors lavishly, also have illustrations and explanatory text suitable for home owners.

The company has also revised its line of 110 units and has published a catalogue describing this unit in detail.

McIlvaine Oil Burner Testimonial

The McIlvaine Burner Corporation, 749 Custer Avenue, Evanston, Illinois, has published a new folder "What Famous Engineers Say About Continuous Operation." This folder cites quotations from several well known engineers and research men who have tested burner efficiencies for both continuous and intermittent operation systems.

Copies of this folder can be secured from the company.

W. H. Maze Co., Calk Screws

The W. H. Maze Co., Peru, Ill., has prepared an interesting booklet describing the development, use and advantages of the calk screw for fastening steel roofing. The booklet is thoroughly illustrated, interestingly written and practical. Contractors interested in the development of this practical item, or wanting to know just how to do this type of roofing work may secure a copy of the booklet from the company.

Allegheny Steel Co., Leaflet

Allegheny Steel Co., Brackenridge, Penna., has published a leaflet from which contractors can clip a coupon for literature on the properties and uses of the company's Allegheny metal products. If you have not received this leaflet or its coupon you can get a copy from the company.

F. Meyer & Bro. Co. Discount Sheet

The F. Meyer & Bro. Co., of Peoria, Ill., have issued a revised dealer discount sheet effective June 1. The revised sheet shows discounts on all the company's items such as furnace pipe and fittings, registers, faces and specials. Copies of the sheet can be obtained from the company.

CAN YOU TELL ME ?

From Budd-The Furnace Man, 586 Fayette Street, Hammond, Indiana.

Indiana.

Where can I purchase eight or nine inch flexible pipe for use with a large furnace cleaner?

Ans.: American Metal Hose Co., 1326 W. Washington St., Chicago, Ill.; Chicago Tubing & Braiding Co., 216 N. Clinton St., Chicago, Ill.

From Ingle Manufacturing Co., San Diego, Calif.

Will you kindly give us the address of the manufacturers of the new pull-push rule referred to on page 45 of your May 23 issue?

Ans.: Stanley Works, New Britain, Conn.

From Harvey Heating & Plumbing Co., Harvey, N. D.

Where can we buy a small air compressor such as could be driven with a 1/6 horsepower motor or less?

Ans.: Interstate Machinery Co., 130 S. Clinton St., Chicago, Ill.

From U. S. Pressed Steel Co., Kalamazoo, Mich.

Will you please advise us the manufacturers of the Reed Air Filter?

Ans.: American Air Filter Co., 113 Central Ave., Louisville, Ky.

From Thomas Sheet Metal Co., Lewiston, Pa.

Do you know of anyone who deals in or has for sale a second hand bending brake capable of bending $\frac{1}{4}$ -inch plate and not less than 12 feet long?

Ans.: Interstate Machinery Co., 130 S. Clinton St., Chicago, Ill.

From Glenn Flesher, Centerville, Ia.

Where can we buy compressed cork, one inch thick, to be used for roof insulation. Please have the manufacturers quote us on 6,000 square feet.

Ans.: Armstrong Cork & Insulation Co., 120 W. Illinois St., Chicago, Ill.; Cork Insulating Co., 357 W. Ontario St., Chicago, Ill.

From Roland Coleman, Painesville, Ohio.

Please give me a list of all the lawn mower makers you have on file?

Ans.: List mailed.

From Ideal Heating Co., Oakland, Calif.

Where are Western Rotary ventilators manufactured?

Ans.: Western Rotary Ventilator Co., Inc., 1720 E. 14th St., Los Angeles, Calif.

From F. T. Daly, Vancouver, B. C., Canada.

Where can I buy pressed steel pulley wheels of 8", 10" and 12" diameter?

Ans.: Link-Belt Co., Vancouver, B. C., Canada; American Pulley Co., 536 First Ave., S, Seattle, Wash.; Allis-Chalmers Mfg. Co., 1623 Smith Tower, Seattle, Wash.

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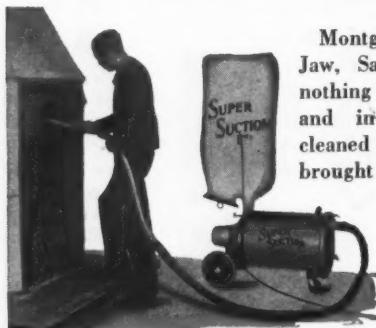
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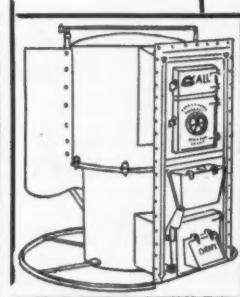
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CAN YOU TELL ME ?

From South Side Hardware & Plumbing Co., Sheboygan, Wis.

Please advise us the present address of the Akrat Ventilators, Inc.

Ans.: Akrat Ventilators, Inc., 1717 Carroll Ave., Chicago.

From Klein Stove Co., Philadelphia, Pa.

Will you kindly advise us the names of the people who manufacture furnace pokers?

Ans.: Fanner Mfg. Co., Brookside Park, Cleveland, Ohio; Henry Furnace & Foundry Co., 3471 E. 49th St., Cleveland, Ohio; Independent Register & Mfg. Co., 3741 E. 93rd St., Cleveland, Ohio.

What firms manufacture chains?

Ans.: Bead Chain Mfg. Co., Bridgeport, Conn.; Bridgeport Chain & Mfg. Co., Bridgeport, Conn.; Cleveland Chain & Mfg. Co., Cleveland, Ohio; Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill.; J. M. Russell Mfg. Co., Naugatuck, Conn.; Turner & Seymour Mfg. Co., Torrington, Conn.

What companies manufacture pulleys?

Ans.: Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill.; Stover Mfg. & Engine Co., Freeport, Ill.

Can you tell us the makers of fabricated steel furnace casing rings?

Ans.: Douglas & Lomason Co., 5836 Lincoln Ave., Detroit, Mich.; Forest City Foundries Co., Cleveland, Ohio; Kawneer Mfg. Co., Niles, Mich.

Will you advise us the names of the companies who make pipeless registers?

Ans.: Auer Register Co., 3608 Payne Ave., Cleveland, Ohio; Forest City Foundries Co., W. 27th St., Cleveland, Ohio; Harrington & King Perforating Co., 5649 Fillmore St., Chicago, Ill.; Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill.; Independent Register & Mfg. Co., 3741 E. 93rd St., Chicago, Ill.; Peerless Foundry Co., 1830 Ludlow St., Indianapolis, Indiana; Rock Island Register Co., Rock Island, Ill.; Tuttle Bailey Mfg. Co., 10th & Berry, Brooklyn, N. Y.; United States Register Co., Battle Creek, Mich.

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The Linde Air Products Company, 30 East 42nd Street, New York, N. Y., announces that substantial reductions in the prices of Oxweld Welding and Cutting Blowpipes are now in effect.

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Along with other price reductions in Oxweld Blowpipes, the Oxweld Type C-11 Cutting Blowpipe is being offered at a new low price. This blowpipe, with a complete cutting range, may be used either with a low pressure injector or a medium pressure mixer nozzle.

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No. 2 PUNCH



Length, 23 inches. Capacity $5/16$ -inch hole through $\frac{1}{4}$ -inch iron. Punches and dies in sizes, $3/32$ -inch to $\frac{1}{2}$ -inch by 64ths.

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Companion to No. 2 Punch. Every part of the two Punches interchangeable, including punches and dies. Capacity, $\frac{1}{4}$ -inch hole through $\frac{1}{4}$ -inch iron.

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Length— $8\frac{1}{2}$ inches. Capacity— $\frac{1}{4}$ -inch through 16 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies— $1/16$ " to $9/32$ " by 64ths.

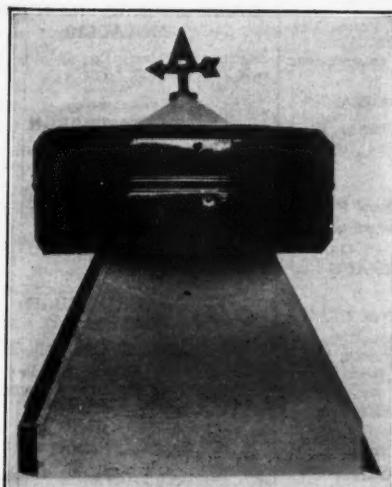
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Owens-Illinois Glass Co., Toledo, Ohio

AIR CONDITIONERS (See Unit Air Conditioners)

AIR WASHERS

Health Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Meyer Furnace Co., The, Peoria, Illinois.

BLAST GATES

Berger Bros. Co., Philadelphia, Pa.

BLOWERS

Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Vent. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland,
Ohio
Meyer Furnace Co., The, Peoria, Illinois.

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Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.

BRAKES—CORNICE

Dreis & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.

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American Brass Co., Waterbury, Conn.
Revere Copper and Brass, Inc., Rome,
N. Y.

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Berger Bros. Co., Philadelphia, Pa.
Fanner Mfg. Company, Cleveland, Ohio

CEILINGS—METAL

Globe Iron Roofing and Corrugating Com-
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Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City

CEMENT—FURNACE

Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City
Northwestern Stove Repair Co., Chicago.

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Hart & Cooley Mfg. Co., Chicago, Ill.
Russell Mfg. Co., Inc., The John M.
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CHAPLETS

Fanner Mfg. Company, Cleveland, Ohio

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Brilliant Furnace Co., Brilliant, Wis.
Densmore & Quinlan Co., Kenosha, Wis.
National Super Service Co., Toledo, Ohio
Northwestern Stove Repair Co., Chicago.
Ramey Mfg. Co., The, Columbus, Ohio.

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Brown Wales Co., Boston, Mass.
Revere Copper & Brass, Inc., Rome, N. Y.

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Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City

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Interstate Machinery Co., Chicago, Ill.

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Barnes Metal Products Co., Chicago, Ill.
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Parker-Kalon Corp., New York, N. Y.
Young Ventilating Co., Cleveland, Ohio

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Globe Iron Roofing & Corrugating Co.,
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American Air Filter Co., Inc., Louisville,
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Kleenair Filter Co., Stevens Point, Wis.
Owens-Illinois Glass Co., Toledo, Ohio

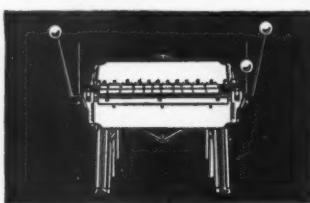
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Ky.
Owens-Illinois Glass Co., Toledo, Ohio

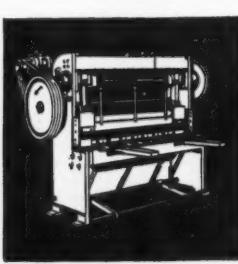
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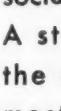
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Henry Furnace & Foundry Co., Cleveland, Ohio.

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Henry Furnace & Foundry Co., Cleveland, Ohio

Lennox Furnace Co., Marshalltown, Iowa
Meyer Furnace Company, Peoria, Ill.
Payne Furnace and Supply Co., Beverly Hills, Calif.
Round Oak Furnace Co., Dowagiac, Mich.
Security Store & Mfg. Co., Kansas City, Mo.

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Forest City Foundries Co., Cleveland, Ohio

FURNACES—OIL BURNING

Meyer Furnace Co., The, Peoria, Illinois.
Motor Wheel Corp., Heater Div., Lansing, Mich.

FURNACES, GAS SOLDERING

Interstate Machinery Co., Chicago.

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(See Also Unit Air Conditioners)

Agricola Furnace Co., Gadsden, Ala.
Andes Range & Furnace Corp., Geneva, N. Y.
Brillion Furnace Co., Brillion, Wis.
Deshler Foundry & Machine Works, Deshler, Ohio
Floral City Heater Co., Monroe, Mich.
Forest City Foundries Co., Cleveland, Ohio
Health-Air Systems, Ann Arbor, Mich.
Henry Furnace & Fdy. Co., Cleveland, Ohio
Hess Warming & Vent. Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Iowa
May-Fiebeger Co., The, Newark, Ohio
Meyer Furnace Co., The, Peoria, Illinois
Motor Wheel Corp., Heater Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Payne Furnace & Supply Co., Beverly Hills, Calif.
Peerless Foundry Co., Indianapolis, Ind.
Round Oak Furnace Co., Dowagiac, Mich.

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Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Chicago, Ill.
Independent Register & Mfg. Co., Cleveland, Ohio.
Meyer & Bro. Co., F., Peoria, Ill.
Rock Island Register Co., Rock Island, Ill.

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Berger Bros. Co., Philadelphia, Pa.

HANDLES—FURNACE DOOR

Fanner Mfg. Co., Cleveland, Ohio.

HANDLES—SOLDERING IRON

Parker-Kalon Corp., New York, N. Y.

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Motor Wheel Corp., Heater Div., Lansing, Mich.
Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
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HEATERS—SCHOOL ROOM

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Meyer Furnace Company, The, Peoria, Ill.

HUMIDIFIERS

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Columbus Humidifier Co., Columbus, Ohio.
Hess Warming & Vent. Co., Chicago, Ill.
Meyer & Bro. Company, F., Peoria, Ill.
Sallada Mfg. Co., Minneapolis, Minn.

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Bertsch & Co., Cambridge City, Ind.
Interstate Machinery Co., Chicago, Ill.

MACHINERY—REBUILT AND USED

Interstate Machinery Co., Chicago, Ill.

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Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa.
Parker-Kalon Corp., New York, N. Y.
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Meyer & Bro. Co., F., Peoria, Ill.
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Peerless Foundry Co., Indianapolis, Ind.

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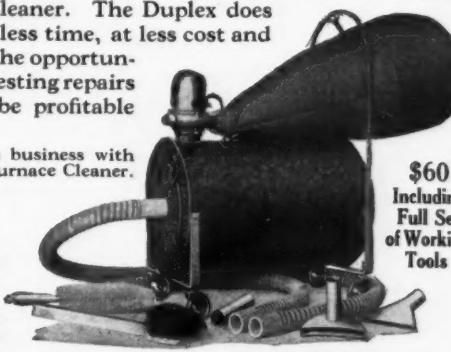
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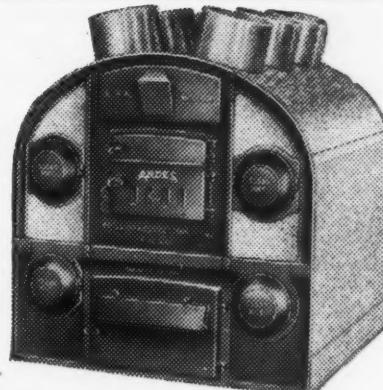
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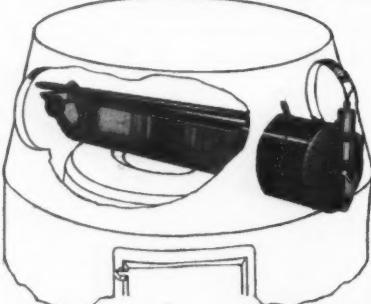
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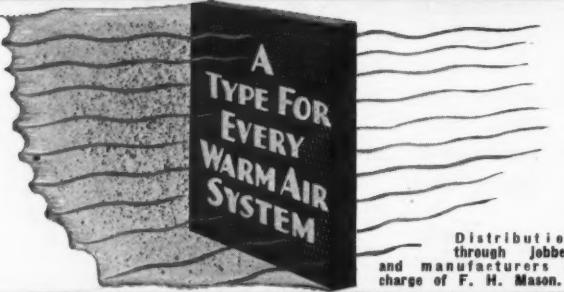
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Hart & Cooley Mfg. Co., Chicago, Ill.

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Interstate Machinery Co., Chicago, Ill.
Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

PUNCHES—COMBINATION BENCH AND HAND

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Parker-Kalon Corp., New York, N. Y.

PUNCHES—HAND

Interstate Machinery Co., Chicago, Ill.
Parker-Kalon Corp., New York, N. Y.
W. A. Whitney Mfg. Co., Rockford, Ill.

RADIATOR CABINETS

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Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.

REGISTERS

Auer Register Co., Cleveland, Ohio.
Forest City Foundries Co., Cleveland, Ohio.
Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland,
Ohio.
Independent Register & Mfg. Co., Cleve-
land, Ohio.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Peerless Foundry Co., Indianapolis, Ind.

REGISTERS—WOOD

Auer Register Co., Cleveland, Ohio.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.

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Young Ventilating Co., The, Cleveland, O.

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Hart & Cooley Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Min-
neapolis, Minn.

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Brauer Supply Co., A. G., St. Louis, Mo.
Des Moines Stove Repair Co., Des Moines,
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Northwestern Stove Repair Co., Chicago,
Ill.
Peerless Foundry Co., Indianapolis, Ind.

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Milcor Steel Co., Milwaukee, Canton, Chi-
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Forest City Foundries Co., Cleveland, Ohio.

ROOF FLASHING

Barnes Metal Products Co., Chicago, Ill.
Globe Iron Roofing & Corrugating Co.,
Cincinnati, Ohio.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.

ROOFING—IRON AND STEEL

American Rolling Mill Co., Middletown,
Ohio.

Barnes Metal Products Co., Chicago, Ill.
Globe Iron Roofing & Corrugating Co.,
Cincinnati, Ohio.

Inland Steel Company, Chicago, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Newport Rolling Mill Co., The, Newport,
Ky.
Republic Steel Corp., Youngstown, Ohio.

ROOFING—TIN AND TERNE

Berger Bros. Co., Philadelphia, Pa.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

RUBBISH BURNERS

Hart & Cooley Mfg. Co., Chicago, Ill.

SCREWS—HARDENED METALLIC DRIVE

Interstate Machinery Co., Chicago, Ill.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Parker-Kalon Corp., New York City.

SCREWS—HARDENED SELF TAPPING SHEET METAL

Interstate Machinery Co., Chicago, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Parker-Kalon Corp., New York City.

SCREENS—PERFORATED METAL

Harrington & King Perforating Co., Chi-
cago, Ill.

SCUPPERS

Aeolus Dickinson, Chicago, Ill.

SHEARS—HAND AND POWER

Dries & Krump Mfg. Co., Chicago, Ill.
Interstate Machinery Co., Chicago, Ill.
Marshalltown Mfg. Co., Marshalltown, Iowa.
Viking Shear Company, Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.

SHEET METAL SCREWS— HARDENED, SELF-TAPPING

Interstate Machinery Co., Chicago, Ill.
Parker-Kalon Corp., New York City.

SHEETS—ALLOY

Inland Steel Company, Chicago, Ill.
International Nickel Co., New York, N. Y.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—BLACK, CORRU- GATED, GALVANIZED

American Rolling Mill Co., Middletown,
Ohio.

Granite City Steel Co., Granite City, Ill.
Inland Steel Company, Chicago, Ill.
Milcor Steel Co., Milwaukee, Canton, Chi-
cago, LaCrosse, Kansas City.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—COPPER

American Brass Co., Waterbury, Conn.
Revere Copper & Brass, Inc., Rome, N. Y.

SHEETS—COPPER BEARING STEEL

American Rolling Mill Co., Middletown, O.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.

BUYERS' GUIDE

Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—COPPER (LEAD COATED)

American Brass Co., Waterbury, Conn.
Revere Copper & Brass, Inc., Rome, N. Y.

SHEETS—IRON

American Rolling Mill Co., Middletown, O.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—MONEL METAL

International Nickel Co., New York.

SHEETS—NICKEL

International Nickel Co., New York.

SHEETS—PURE IRON COPPER ALLOY

Inland Steel Co., Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.

SHEETS—REFINED OPEN HEARTH IRON

American Rolling Mill Co., Middletown, O.
Republic Steel Corp., Youngstown, Ohio.

SHEETS—SPECIAL FINISH

American Rolling Mill Co., Middletown, O.
Inland Steel Company, Chicago, Ill.
Newport Rolling Mill Co., Newport, Ky.
Republic Steel Corp., Youngstown, Ohio.

SHEETS, STAINLESS STEEL

Republic Steel Corp., Youngstown, Ohio.

SHINGLES AND TILE—METAL

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

SKYLIGHTS

Globe Iron Roofing & Corrugating Co., Cincinnati, Ohio.
Meyer & Bro. Co., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

SNOW GUARDS

Berger Bros. Co., Philadelphia, Pa.

SOLDER

Brown Wales Co., Boston, Mass.
Kester Solder Co., Chicago, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

SOLDER—ACID CORE

Kester Solder Co., Chicago, Ill.

SOLDER—ROSIN CORE

Kester Solder Co., Chicago, Ill.

SOLDER—SELF-FLUXING

Kester Solder Co., Chicago, Ill.

STARS—HARD IRON CLEANING

Fanner Mfg. Company, Cleveland, Ohio.

STOKERS

Fire-King Stoker Co., Indianapolis, Ind.

STOVE PIPE AND FITTINGS

Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

STOVE AND FURNACE TRIMMINGS

Fanner Mfg. Co., Cleveland, Ohio.

STRAINERS—ROOF

Barnes Metal Products Co., Chicago, Ill.

STRAPS—ORNAMENTAL PIPE

Barnes Metal Products Co., Chicago, Ill.

TINPLATE

Berger Bros. Co., Philadelphia, Pa.
Brown Wales Co., Boston, Mass.
Granite City Steel Co., Granite City, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.
Republic Steel Corp., Youngstown, Ohio.

TOOLS—TINSMITH'S

(See Machines & Tools—
Tinsmith's)

TRIMMINGS, FURNACE

Fanner Mfg. Co., Cleveland, Ohio.

TRIMMINGS, INCINERATOR

Fanner Mfg. Co., Cleveland, Ohio.

UNIT AIR CONDITIONERS

Andes Range & Furnace Corp., Geneva, N. Y.
Forest City Foundries Co., Cleveland, O.
Henry Furnace & Fdry. Co., Cleveland, O.
Health-Air Systems, Ann Arbor, Mich.
Hess Warming & Ventilating Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Iowa.
May-Flebeger Company, Newark, Ohio.
Meyer Furnace Co., Peoria, Ill.
Motor Wheel Corp., Lansing, Mich.
Payne Furnace & Supply Co., Beverly Hills, Calif.

VACUUM CLEANERS—FURNACE

(See Cleaners—Furnace Vacuum)

VENTILATORS—CEILING

Hart & Cooley Mfg. Co., Chicago, Ill.
Henry Furnace & Fdy. Co., Cleveland, O.
Independent Reg. & Mfg. Co., Cleveland, Ohio.

VENTILATORS—FLOOR

Aeolus Dickinson, Chicago, Ill.

VENTILATORS—ROOF

Aeolus Dickinson, Chicago, Ill.
Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Company, Akron, Ohio.
Jordan & Co., Paul R., Indianapolis, Ind.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

WELDERS, SPOT

Interstate Machinery Co., Chicago.

WOOD FACES—WARM AIR

Auer Register Company, Cleveland, Ohio.
Meyer & Bro. Co., F., Peoria, Ill.
Milcor Steel Co., Milwaukee, Canton, Chicago, LaCrosse, Kansas City.

CHAIN AND S-HOOKS



Single Jack Chain



Safety Chain



Sash Chain



Register Chain

For furnace damper regulators, thermostats, furnace clocks, skylights and ventilators. Put up 250, 500 or 1,000 feet to the reel, or in boxes to desired length. Furnished, if desired, coppered, sheradized or hot galvanized to prevent rusting.

WRITE US FOR PRICES

THE JOHN M. RUSSELL
MFG. COMPANY, INC.
901 Rubber Avenue
NAUGATUCK, CONN.



**YOUNG
REGULATOR**

The simplicity of the Young Regulator is one of its important features. Anyone can accurately control heat or air volume flowing from ducts. Calibrated and equipped with a locking device, it affords an efficient means of heat or ventilation control. Details upon request.

THE YOUNG VENTILATING COMPANY
2703-05 Woodland Avenue—Cleveland, Ohio

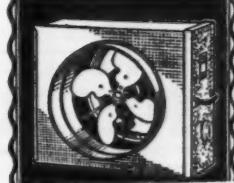
NEW PROFITS FOR FURNACE MEN NOW ASK FOR COMPLETE INFORMATION ABOUT

NiAGARA

GAS AND COAL WARM AIR
FURNACES

THE FOREST CITY FOUNDRIES COMPANY
Cleveland, Ohio

A-C Thermostatically Controlled Automatic HEAT BOOSTER



TAKE advantage of the profit opportunities offered you in the sale of A-C Thermostatically Controlled Automatic Heat Boosters.

Write for the complete story. Then check up your prospect list and go to work. There is profit to be had and the A-C will do its share to help you get it.

A-C MANUFACTURING CO.
417 SHERMAN AVENUE
PONTIAC, ILL.

CLASSIFIED ADVERTISING

SITUATIONS OPEN

WANTED SALESMAN—WE HAVE AN attractive commission proposition open for salesmen of proven ability, who appreciate the opportunity in modern warm air heating and air conditioning field. Our line represents individuality, outstanding fuel economies—make it one of the most attractive selling propositions in the field today, for aggressive salesmen with engineering ability and sales energy. Include your complete experience and sales references with your application. Address Dail Steel Products Co., Lansing, Michigan.

Salesmen

traveling Illinois and other Central Western states—wanted to sell our warm air heating accessories to the jobbing and retail trade on straight commission basis. Only high-grade men will be considered. Address Key 151, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

EXPERIENCED FURNACE SALESMAN wanted. Must be experienced in forced air and gravity heating. Address Key 132, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

PRESS ROOM FOREMAN—MAN THOROUGHLY EXPERIENCED IN OPERATION OF Dies and Presses on stove work. State age, experience and wages expected. Steady employment for right man. James Graham Manufacturing Co., Newark, California.

WANTED—A WORKING FOREMAN, also one journeyman sheet metal worker, for all-around sheet metal shop. Must be hustlers and capable. Give full details as to experience in different branches; age; union or non-union; wages expected; reference; etc. Address Key 140, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED—ALL-AROUND SHEET METAL worker at once. Small city in central Wisconsin. Must be a hustler. Address Key 131, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATIONS WANTED

SITUATION WANTED—BY MAN 38 years old. 15 years' experience in general hardware. Best references. Address L. J. Bergman, Iowa Falls, Ia.

SITUATION WANTED—BY A COMPE- tent heating man and sheet metal worker; can also do steam work and plumbing. Experienced in gravity and forced air. Can make layouts on either warm air or steam jobs. 25 years' experience; married; strictly sober and can come at once. Address Key 153, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—BY SHEET metal mechanic, experienced on general jobbing, gutter and shop repair work—warm air heating also pipe fitting. Address Key 152, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—BY FIRST class sheet metal worker. Can estimate work and lay out patterns. Expert furnace installer. Good salesman. Hardware experience. Best of references. Address Key 155, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—BY A GENERAL all-around tinner; small town or city preferred. Years of experience at tinning and furnace work; hardware clerk. Address "Tinner," Route 4, Box 182, Des Moines, Iowa.

ENGINEER

Correspondence solicited with manufacturer developing or producing air conditioning units, or with contractor specializing in fan heating. Twenty years' practical experience; member A. S. H. V. E., A. S. M. E.

G. A. VOORHEES, 633 So. Delaware St., Indianapolis, Ind.

SITUATION WANTED—BY SHEET metal mechanic experienced on general jobbing work, gutter and shop repair work, warm air heating; also pipe fitter. Address Key 143, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

SITUATION WANTED—GOOD SHEET metal plumber and furnace man open for good position. Can go to work at once. All references. Married. Address Key 144, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

SITUATION WANTED—A-1 SHEET metal worker wishes situation in town or small city. Can handle all classes of tin and sheet metal work. Steady work more essential than wages. Address Metal Worker, 154 Oakland Avenue, Macon, Georgia.

SITUATION WANTED—BY RELIABLE heating and sheet metal worker. Long general experience in warm air heating, sheet metal work and plumbing. Can lay out heating systems of all kinds, figure and handle men. Neat and accurate with work. A-1 habits. Address Key 145, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

SITUATION WANTED—LICENSED plumber, employed at present, desires steady position in small or medium sized town, Southern Colorado preferred. Address Key 128, "American Artisan," 1900 Prairie Ave., Chicago, Illinois.

A-1 SHEET METAL WORKER, PLUMBER and heating man with Illinois and Wisconsin State license. Layout man on all lines. Prefer steady position by middle-aged man. Address Cal. W. Hurt, Box 384, DeKalb, Illinois.

WANTED—POSITION BY FIRST CLASS sheet metal worker. Can do anything in that line. Also, can do estimating and designing of dust and shaving collecting systems. Able to take complete charge of shop and show results. Address Arno Goethel, 20—8th St., N. E., Rochester, Minn.

SITUATION WANTED—A-1 SHEET metal and heating man with twenty years' experience. Can do plumbing; also welding, brazing and silver soldering. Have had experience on electric refrigerator experimental work. Can furnish reference. Address Key 130, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—FOR A SHEET metal apprentice, 4 years' trade school training, high school graduate, one year's experience in general sheet metal work. Good character, exceptional references. The type of apprentice that will prove an asset to any progressive sheet metal shop. Address Sheet Metal Department, Mooseheart, Ill.

SITUATION WANTED—BY AN ALL around sheet metal worker. Can handle any branch of the trade such as cornice, skylights, ventilation and hot air heating and conditioning. Can make estimates and run the shop, prefer a position with good hardware company or job shop. Will go any place. Address Key 139, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

SITUATION WANTED—LICENSED plumber, employed at present, desires steady position in small or medium sized town, Southern Colorado preferred. Address Key 128, "American Artisan," 1900 Prairie Ave., Chicago, Illinois.

MANUFACTURERS OF WARM AIR furnaces and heating appliances, will find in me an unusual opportunity for your sales promotion work. I understand the furnace and fitting business through years of actual experience from installation, dealers, and sales manager for wholesale purposes. Am a graduate engineer, know forced air, gravity, standard code, air conditioning, designing of systems for sales work, etc. Member of A.S.H.E. I desire connection with manufacturer as sales representative or branch manager, best of references. Address Key 125, "American Artisan," 1900 Prairie Ave., Chicago, Ill.

SHEET METAL MACHINERY

COMPLETE STOCKS—NEW—USED—HAND OR POWER

Rebuilt Bargains

50 in. 10 ga. Beloit Power Slip Roll....	\$175.00
Chicago Elbow Machine.....	145.00
Viking Compound Lever Shear.....	8.75
Unishear Mighty Midget.....	30.00
42 in. Niagara Universal Folder and Brake with Stand.....	75.00
Peete Plain Crimper.....	6.50

WE BUY—SELL—EXCHANGE

INTERSTATE MACHINERY CO.

130 S. CLINTON ST., CHICAGO



Air Conditioning

- The Health Air Blower
- A Complete Air Conditioner
- for New or Old Installations

Low Priced Write for our Attractive Proposition **Efficient**
HEALTH AIR SYSTEMS, 1105 N. Main St., Ann Arbor, Mich.



CLASSIFIED ADVERTISING

SITUATION WANTED—BY A SHEET
metal worker and furnace man. Best references; 38 years old; 22 years' experience. Address V. H. Worrell, 1033 Dawson Street, Waterloo, Iowa.

SITUATION WANTED—A FIRST CLASS,
A-1 Mechanic with more than twenty years' experience in all lines of the sheet metal trade wishes to hear from someone who needs a first class man. Can give best of references and go anywhere. Address Edward H. Collins, 154 Oakland Avenue, Macon, Georgia.

SITUATION WANTED—CAN YOU MAKE
use of this ability? Complete knowledge of and wide experience in every phase of warm air heating, selling, designing, installing. Thorough knowledge of every essential of repair work, advertising and sales promotion experience of high type. A good working knowledge of domestic air conditioning. Experienced in training and developing salesmen. Address Key 126, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

FOR SALE

FOR SALE—ONE EIGHT FOOT STEEL
brake. Address Key 159, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

NEW SKEL GAS STOVE AND COM-
plete demonstrating outfit, all for \$25. Address Moser Brothers, Sabetha, Kansas.

FOR SALE—SHEET METAL BUSINESS
in central Wisconsin. Manufacturing town. Address Key 160, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

FOR SALE—COMBINATION SHEET
metal and plumbing shop southwest Kansas town; population 9,000. Apartment in shop and house on ground can be rented out. Will adjust inventory to suit buyer. Address H. F. Dobson, Wichita, Kansas.

FOR SALE—ONE OF THE BEST SHEET
Metal shops in Iowa in one of the best towns in Iowa. Good business, little competition. A splendid opening for a good progressive sheet metal man. Address Key 142, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

FOR SALE—ONE SETTING DOWN MA-
chine and stand. One adjustable 30" pipe folder. One large Buffalo groover. One combination pipe cutter and crimper. All the above tools are in good order, the first \$50.00 check received will get at least \$150.00 worth of tools. Jack Laurie, Churubusco, Ind.

FOR SALE—FURNACE AND SHEET
metal business at far below cost; consisting of complete line of tools, 1½ ton Ford truck and office equipment. Can lease or buy building. An unusual opportunity for a party wishing to engage in business. Located in one of Indiana's best cities. Address Key 158, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE—A 42" PEXTO AND WILCOX
square shears, in good shape, complete with back and front gauges. Will take \$50.00 cash. Address Key 136, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

FOR SALE—ONE 30-SQUARING SHEARS,
Good condition. Address Key 133, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED TO BUY

WANTED—USED SUCTION FURNACE
cleaner. State make, age, condition and price. Address Trotter Hardware Company, East Liverpool, Ohio.

WANTED TO BUY—ONE 8 OR 10-FOOT
steel brake. Address Key 134, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

WANTED TO BUY—A HEATING,
Plumbing and sheet metal shop. Must be in Illinois and a good paying shop, no other need answer. Address Key 146, "American Artisan," 1900 Prairie Avenue, Chicago, Ill.

WANTED TO BUY—OR TO RUN—A
shop doing sheet metal and furnace work in a town in Minnesota or South Dakota. I am an A-1 man and would like to buy a shop if it were in a good town. Address Key 138, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

LINES WANTED

Furnace Manufacturers

Are you looking for honest-to-goodness representation in Philadelphia? We have been in business for the past eight years and enjoy the confidence of the jobbers. Let us show you our records and you can judge for yourselves whether or not we can give you profitable service. Commission basis. Address Key 147, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

LINES WANTED—EXPERIENCED FUR-
nace salesman covering Iowa is open for some side lines on commission basis. Address Louis Roos, 1614 East 8th St., Des Moines, Ia.

MR. MANUFACTURER—DO YOU WANT
California business? Aggressive salesman—Thoroughly familiar with heating and sheet metal industry is anxious to line up with good manufacturer who can use increased business from California territory. I have sold to both jobber and installer. Address Key 137, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

LINES TO HANDLE

Salesmen Wanted

We are interested in getting good men to sell our humidifier to the jobbing and retail trade in Chicago, Kansas City, Portland, Omaha, San Francisco, Los Angeles and Boston. Straight commission basis. No objection to other lines but we want men only who are willing to work. Address Key 148, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

Manufacturers' Agents

There is good money to be made in the warm air heating industry today. Jobbers are adding new lines to take the place of non-productive items. We can use aggressive commission men to sell the wholesale and retail trade. Our line of furnaces is complete and well-known. Address Key 149, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

Commission Salesmen

Wanted to sell our line of sheet metal tools to jobbers and contractors. State territory covered, number of lines you now carry. Liberal discount to the right men. Address Key 150, "American Artisan," 1900 Prairie Avenue, Chicago, Illinois.

MISCELLANEOUS

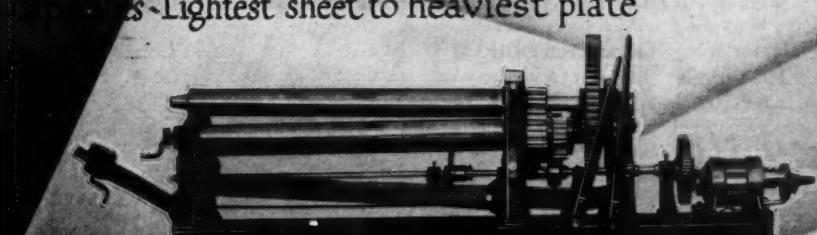
PHILIP V. W. PECK

Patent and Trade Mark Law
Barrister Bldg., Washington, D. C.

FULL SIZE PATTERNS FOR BOATS

Building up-to-date Outboard Boats, Canoes, Hunting and Fishing Boats with our full size paper patterns.
Sectional or One-Piece
Write for Free Illustrated Folder No. 11
H. F. THOMPSON Boat and Pattern Works
Decorah, Iowa. Dept. A.

PLATE BENDING ROLLS
From Lightest sheet to heaviest plate



BERTSCH & COMPANY
Cambridge City, Indiana

Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work.

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You Must Have Business Now

We realize what you heating men
are up against

**Here is the answer
to your urgent needs
Let us help you**

Dozens of furnaces in your locality will have to be replaced before next winter, and a fuel supply must be bought too. This double expense is pretty tough on the home owner isn't it? But you can help them

With a Profit for Yourself

▼
Replace their burned out furnaces
with
PAYNE GAS FURNACES

They will have no fuel to buy this Summer. They pay their winter fuel bill AFTER they have used it.

THE COST OF GAS, IF USED IN PAYNE GAS FURNACES COMPETES FAVORABLY WITH THE FUEL THEY HAVE BEEN USING.

Last winter in Denver, Mr. Slaughter heated his home at a saving of \$25 over the cost of the previous year when he used coal. Mrs. Lord saved \$10 and heated a larger home.

Write Today for Details of Dealer Franchise!



**PAYNE FURNACE
& SUPPLY CO.**

Beverly Hills, Cal.
Since 1914

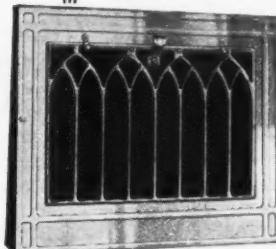
We want your business.

Jobbers and Warehouses near you for prompt service

Everything Points to the Wisdom of STANDARDIZING on! The H & C Line!

FINER Workmanship — Greater Air Capacity — Better Design — Superior Mechanical Features — and a range of selection that Gives You exactly the register best suited to each job.

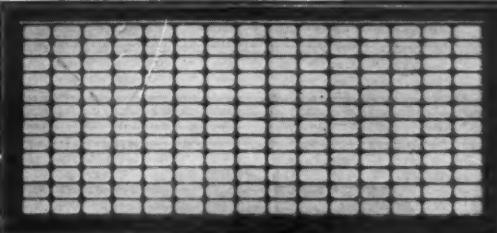
Leading Jobbers Carry Complete Stocks



No. 110

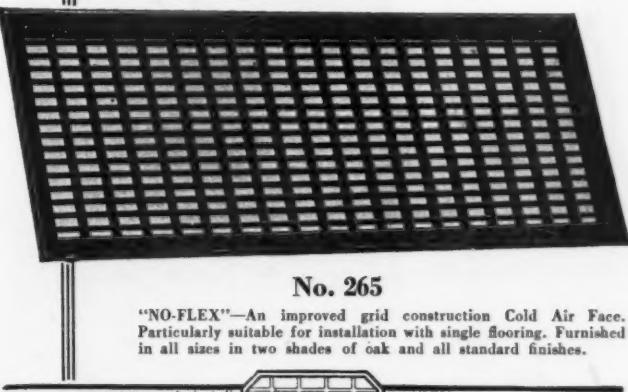
By considerable odds the most popular baseboard register made. You're not limited to this style alone, however, when you standardize on H & C. There are two other attractive designs from which to choose with full lines of sidewall registers and cold air returns to match.

**Two Types of Steel Cold Air Faces
Assure Pleased Customers and Most
Advantageous Installations.**



No. 255

Certainly the finest pressed steel cold air face by any comparison. Our famous pinched-back fretwork affords free air capacity averaging 10% greater than other faces of this type. Check this statement and see for yourself!



No. 265

"NO-FLEX"—An improved grid construction Cold Air Face. Particularly suitable for installation with single flooring. Furnished in all sizes in two shades of oak and all standard finishes.



**WARM AIR
REGISTERS**

HART & COOLEY MFG. CO.

CHICAGO, 61 West Kinzie Street

New Britain, Conn., Corbin Ave.

PHILADELPHIA, Architects Bldg.

Boston, 75 Portland Street

New York,

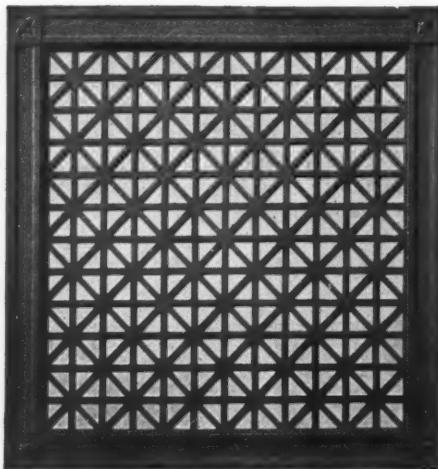
101 Park Ave.

Registers for all purposes. Also a complete line of perforated and cast ornamental grilles, furnace regulators, dampers, pulleys, chain, and the H & C Automatic Heat Control.

PERFORATED METALS

for

EVERY PURPOSE



Send us your specifications for prices on any kind of Perforated Metal.

ARCHITECTURAL GRILLES

You will find our Grilles in modern Schools, Churches, Public Buildings and Homes. We have many beautiful designs from which to select.

"GRILFRAME" enhances the beauty of any design Grille by the addition of a border frame of steel. Write for detailed information.

SAFETY GUARDS—if made from our perforated steel sheets and according to our method are really safe.

PERFORATED METAL of every sort for all uses.

THE HARRINGTON & KING PERFORATING CO.

5649 FILLMORE ST., CHICAGO, ILL., U. S. A.—NEW YORK OFFICE: 114 LIBERTY ST.



Vernois

The Short-Cut to
Greater Profits—
that's the VENOIS
“Better Product” Line

Profits are being made by furnace dealers, but they are getting business on the strength of the “better buy”. The regular remodeling season is under way and the opportunity to do business is presenting itself very forcibly to the furnace dealer offering the Vernois Line.

Your customers are demanding the better type of furnaces that are easiest on the pocketbook. The Vernois Line fills the requirement perfectly.

Let us tell you all about the Vernois Line. Write today for our story.

MT. VERNON FURNACE & MFG. CO.
MT. VERNON ILLINOIS

Hot Weather Means "HOT" VENTILATING PROSPECTS



INSTRUCT YOUR SALESMEN
always to mention the familiar
Armco triangle and what it
stands for: twenty-six years of
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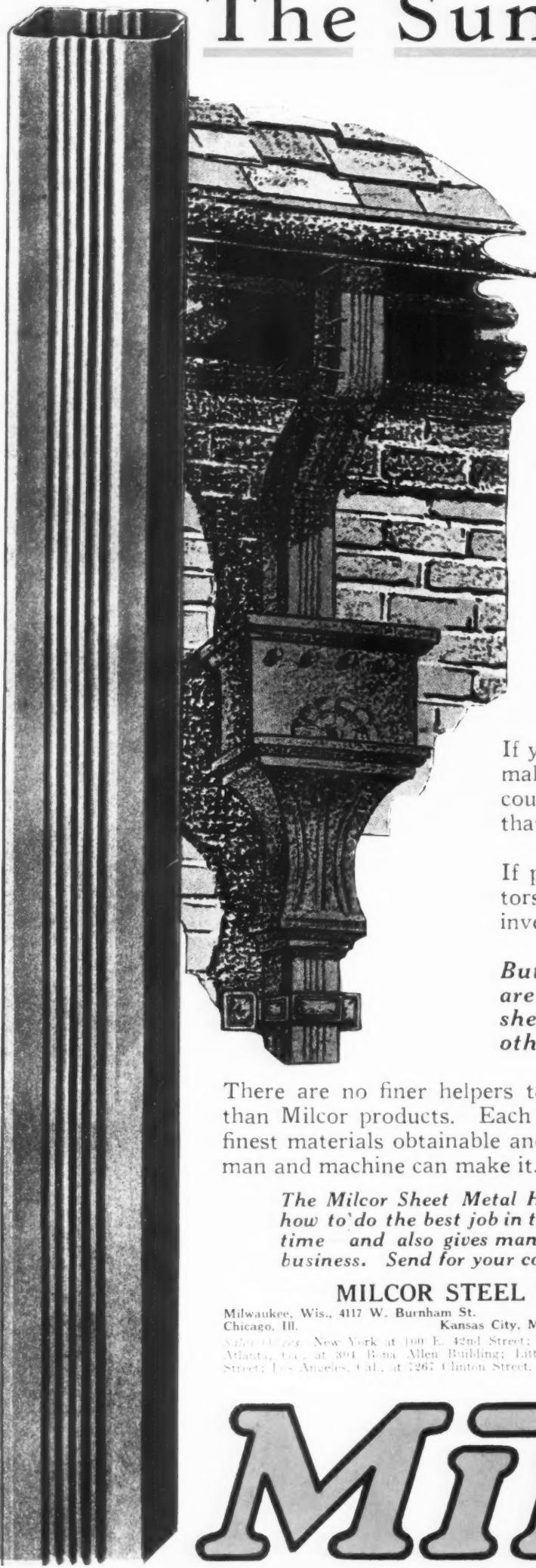
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